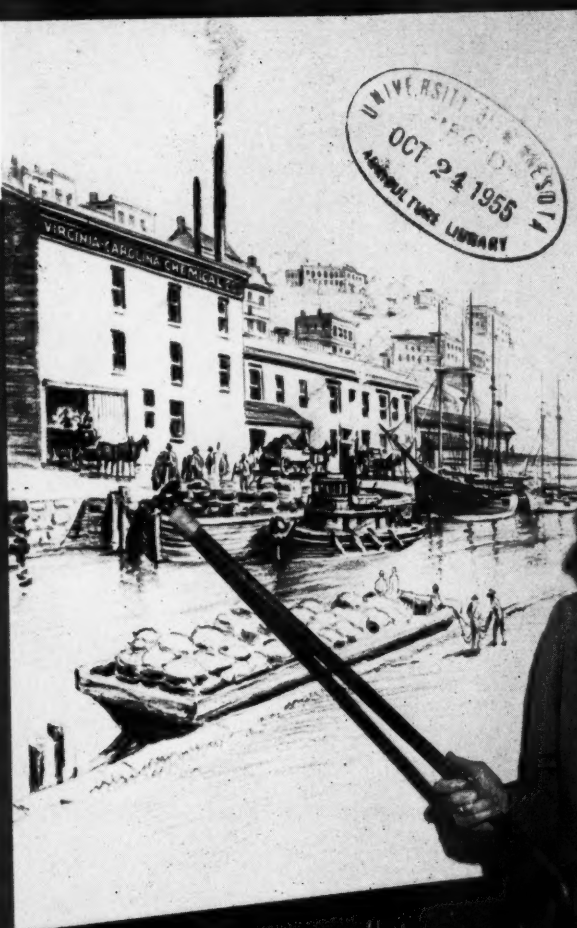


# Farm Chemicals

Pioneer Journal  
of the Industry



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**SOHIO CHEMICAL COMPANY**

**BEGINS SHIPMENTS  
JAN. 1, 1956**

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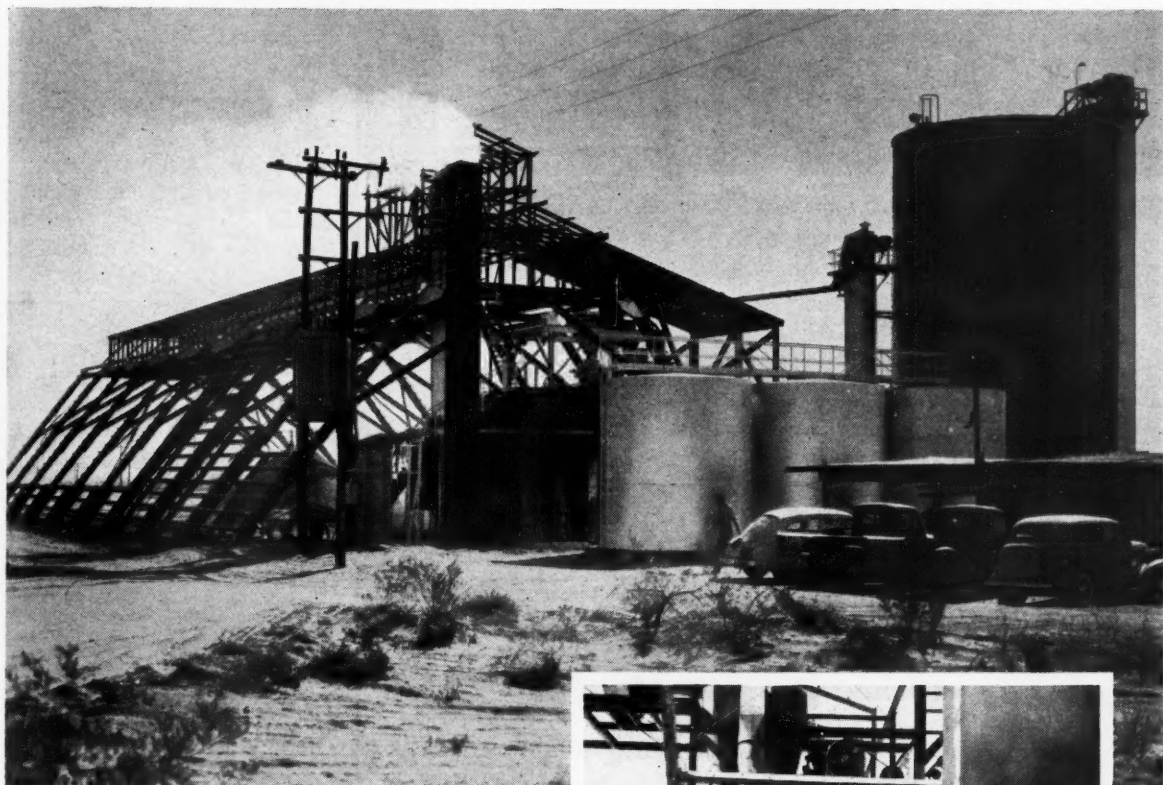
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# Sturtevant Leadership in Fertilizer Granulation...

## 3 PLANTS COMPLETED



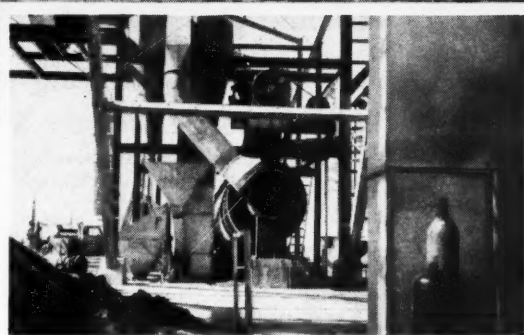
One of the new Sturtevant granulation plants located in El Paso, Texas.

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A recognized leader in the industry, Sturtevant Mill with its vast fertilizer manufacturing experience and know-how can effect operating economies for you.

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Sturtevant granulator and associated equipment for manufacturing granular fertilizer.

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DESIGNERS OF COMPLETE PLANTS AND MANUFACTURERS OF: CRUSHERS • GRINDERS • SEPARATORS • CONVEYORS • MECHANICAL DENS AND EXCAVATORS • ELEVATORS • MIXERS

# Farm Chemicals

OCTOBER, 1955

No. 10

Vol. 118

Pioneer Journal of Farm Chemicals Industry, Est. 1894

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## In this issue . . .

We hope that all our readers in the pesticide field will take a few moments to review the article of W. H. Moyer, president of Chipman Chemical, which begins on page 46. Presented as an address at the recent NACA meeting, it is an excellent discussion of the industry and its problems and future.

For the NAC meeting itself, see page 35 for the first of six pages covering other addresses and the Miller bill panel group. Included are the remarks of FDA's Winton Rankin, who told association members why it has been found necessary to increase the cost of petition filing.

On the more technical side is a paper by K. G. Clark and V. L. Gaddy of the USDA Beltsville station, on the analysis of 18 industrial and sewage sludges. Included are data on the content of various elements and the quality of contained nitrogen. See page 41.

Those attending the Fertilizer Section, National Safety Council meetings in Chicago this month can expect a worthwhile, informative program. Some top speakers have been rounded up as outlined in the complete program on page 32.

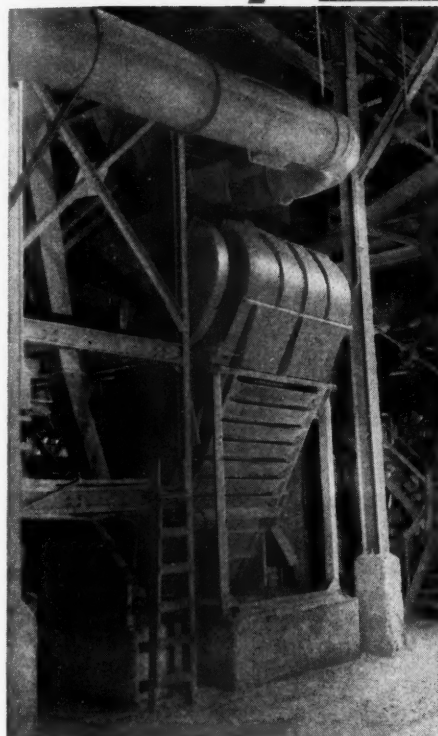
## Cover story

Reminiscing on past accomplishments of Virginia-Carolina Chemical corp. are retired vice-president Edward Ryland, who joined V-C in 1901 and Miss Margaret Davenport, who has served with the company for 46 years. The drawing shows one of the company's first plants. This year V-C celebrated its 60th birthday.

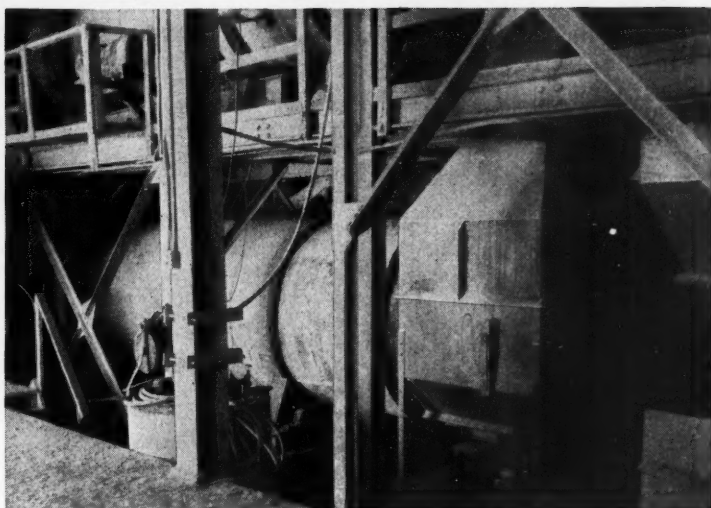
FARM CHEMICALS



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50% more production resulted at Iowa Farm Supply Co., Des Moines, through the aid of Link-Belt engineering counsel. Link-Belt equipment here includes Multi-Louvre Cooler (left), Roto-Louvre Dryer (below), bucket elevator, vibrating screens and power transmission machinery.



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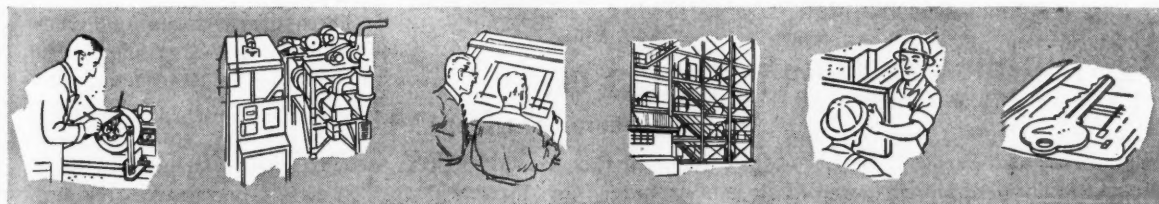
engineers will work directly with you or your consultants... help you produce better fertilizer at lower cost. Write today for a copy of Book No. 2459.



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EQUIPMENT

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OCTOBER, 1955

3

# Business & Management

## .. News of the Industry

### 60th Birthday for V-C Chemical Corp.

This year, Virginia Carolina Chemical corp. is celebrating its 60th birthday. During that period, V-C has grown from a fertilizer concern formed by merger of nine companies to a diversified organization, with widespread plant food operations, phosphate mines, chemical plants, multiwall paper bag and textile bag facilities and a synthetic fiber plant.

At a meeting in 1895 two leaders in the fertilizer industry, Samuel T. Morgan and S. Dabney Crenshaw, developed the idea to combine output of several firms, a move aimed at offering better service to the trade.

After negotiations, eight firms from Richmond, Petersburg and Norfolk, Va. and Durham, N. C. merged to form V-C with offices in the old Haxell-Crenshaw Warehouse in Richmond. This building was the site of a prison during the Civil War.

V-C soon had factories serving the entire south and now its fertilizer plants and sales offices serve farmers west to the Rockies and from Canada to the Gulf of Mexico.

### Helena, Ark. Studied as NFU Plant Site

Helena, Ark., may be the site for a multi-million dollar food and farm chemicals plant, according to James G. Patton, president of National Farmers Union.

J. Albert Hopkins, president of the Arkansas Farmers Union, sparked consideration of eastern Arkansas as a site, pointing out that with construction of a Mississippi River bridge at Helena, the

area would be ideal for serving the South and Southeast. NFU has begun a study of transportation, labor supply, water and other factors.

### Southwest Potash Expands Facilities

At Carlsbad, N. M., Southwest Potash corp. has begun the first major expansion of its potash mine and mill since operations began in late 1952.

Capacity of the facilities is being increased by one-third at an estimated cost of \$2,500,000. The new production will be ready about February, 1956.

According to Southwest Potash, the installations are such that further expansion can readily be accomplished when justified by market conditions.

### N. Division Erects A-N-L Storage Unit

Last month, Nitrogen division anticipated completion of a giant storage building for A-N-L fertilizer at its Hopewell, Va., plant. Designed to hold 35,000 tons of plant food, the 300 x 150-foot structure has walls of pre-cast cement.

The added bulk storage, says Nitrogen division, will minimize the need for packaging A-N-L in advance and shipping it to Southern warehouses.

### Pgh. Coke & Chem. Procurement Dept.

A Chemical Procurement dept. has been formed by Pittsburgh Coke & Chemical co. with J. W. McNeil as manager and H. A. Carpenter as assistant manager.

### FMC Chem. Units Development Dept.

A Central Development department has been established for the chemical divisions of Food Machinery & Chemical Corp. Henry S. Winnicki, former FMC Chemical divisions European representative at Geneva, Switzerland, has been appointed manager.

The unit is designed to assist management in planning for continued development of its chemical activities, maintaining close liaison with the divisions' Central research and central engineering.

Projects for investigation include new growth possibilities, examination of possible chemical ventures, economic evaluations, market situation studies and exploration of European opportunities.

Dr. Charles P. Roberts has replaced Winnicki at Geneva.

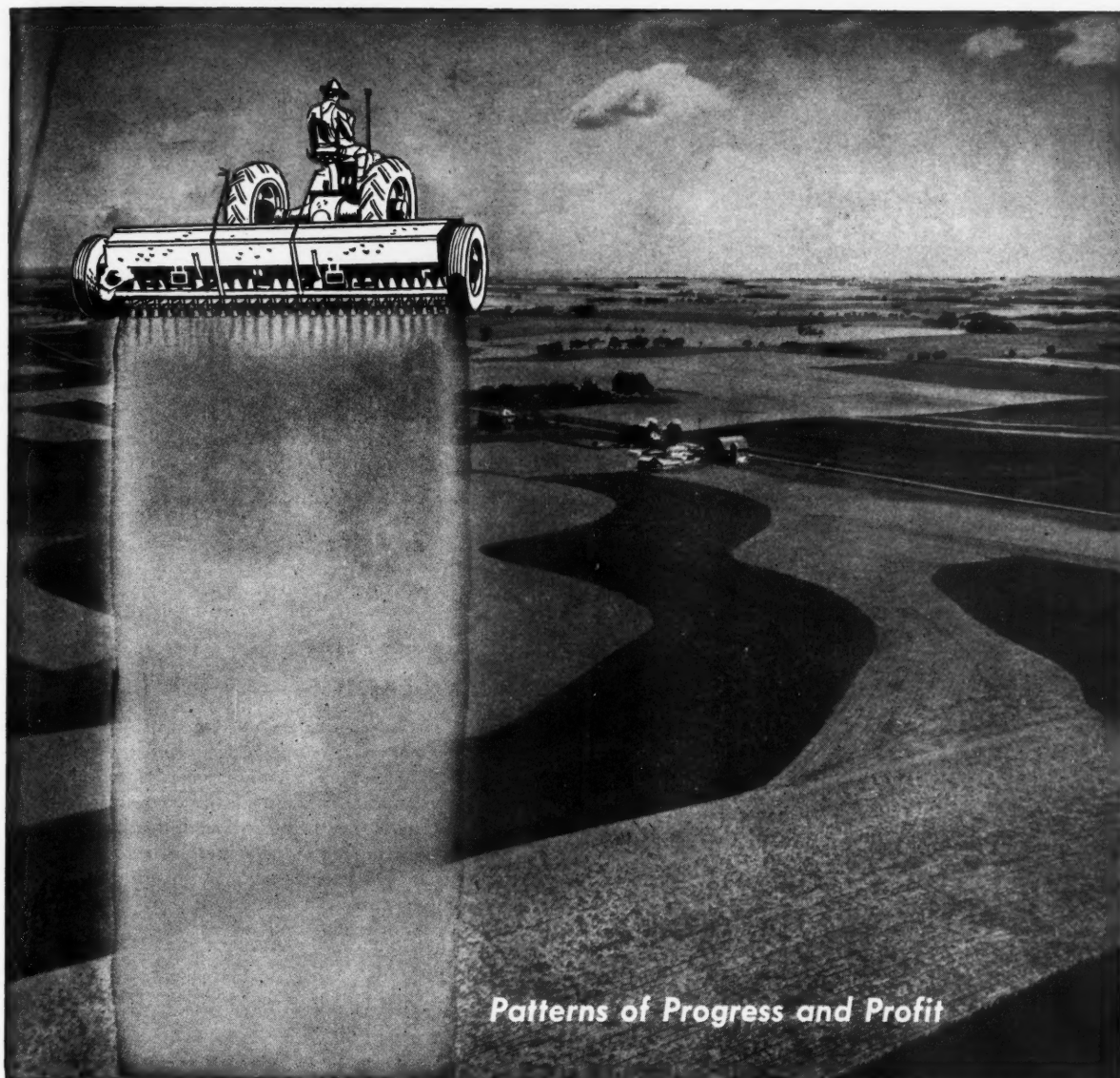
### New Georgia Plant Begins Operations

Initial operations of the new Ideal By-Products co. fertilizer plant at Lawrenceville, Ga., is reported. The company is a division of the Wilson & Toomer Fert. co. employing, at present, about 20 workers.

### Velsicol Corporation, Officers Re-Titled

Velsicol Chemical corp. is the new name for the former Velsicol corp., division of Arvey corp. Because the company now enjoys its own corporate structure, officials felt the new title was more descriptive of its industry relationships and products.

These title changes for executive personnel have also been announced—J. Regenstein, Sr., from president to board chairman; J. Regenstein, Jr., from vice president to president; and E. T. Collinsworth, Jr., from vice president and general manager to executive vice president and general manager.



*Patterns of Progress and Profit*

(Photo — Courtesy Soil Conservation Service, U. S. D. A.)

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*by*



Duval Muriate of Potash  
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OCTOBER, 1955

5



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**COMMERCIAL  
FERTILIZER  
SPREADING!\***



**\*NEW LEADER METERING ATTACHMENT  
ASSURES EXACT SPREAD PER ACRE!**

Here's another New Leader engineering first! A simple, foolproof mechanism—the New Leader Metering Attachment takes all guesswork out of commercial fertilizer spreading. By accurately measuring the amount of fertilizer being fed to the twin distributor discs, correct feedgate settings are obtained. Accurate metering of spreads of from 100 pounds per acre up are assured. This is a feature beneficial to fertilizer manufacturers, suppliers, custom operators and farmers alike.

*Motor-driven twin distributor discs and drive-shaft driven conveyor is the answer to the most accurate truck mounted spreader in the world.*



**COMBINATION SPREADER  
(with Hood in Road Travel or  
Lime Spreading Position)**

Set the feedgate, drive straight and you can't miss getting an accurate spread. Conveyor is geared to ground speed assuring an accurate flow of material. The twin distributor discs are powered by a separate auxiliary engine, which assures you of a constant width of spread, regardless of the speed of the truck.

**NEW LEADER LIME SPREADER**

Twin distributor discs, 24" wide conveyor and large feedgate opening eliminates bridging of material and assures accurate, more even spreads.

**"NEW LEADER" Self-Unloading  
Transports deliver more materials  
FASTER ... AT LESS COST!**



Write today for  
information and prices

Here's one sure way to increase your tonnage and prolong your season by providing commercial fertilizer in bulk to your dealers! The NEW LEADER Self-Unloading Bulk Transport giving your dealers bulk delivery of fertilizer when and where they want it. In addition to mixed goods the NEW LEADER Self-Unloading Bulk Transport can be equipped to haul bagged materials when necessary. Many companies recognize this method of distribution and find that it has reduced many problems such as storage, extra inventory, etc.

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Anhydrous, 97.0%  
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regular and industrial  
grades

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OCTOBER, 1955

## . . . Business & Management

### API Completes 2nd Decade of Service

This year, the American Potash Institute is celebrating its 20th anniversary. Representing a total investment of more than \$7,400,000 contributed by five of the seven US potash producers, it maintains a staff of 16 agronomists serving farmers throughout North America. Since July 1, 1935, more than 200 men engaged in research investigations have been assisted financially in 38 states and provinces.

Commenting on the anniversary in the institute's **BETTER CROPS WITH PLANT FOOD** magazine, H. B. Mann, president, said that its 20 years "have been marked by a splendid spirit of cooperation on the part of the official agricultural research and advisory groups with whom it has been our privilege to work in a common cause. We also are grateful for the support of our member companies whose sympathy with the problems of American agriculture promoted them to continue the support of research even during periods when demand fully equaled the supply of potash."

**The new plant of Mississippi River Chemical co., a division of Mississippi River Fuel corporation.**

The three American potash producers who helped to form the institute, American Potash & Chem. corp., Potash Company of America, and the United States Potash co. still are members and have been joined by Southwest Potash corp. and Duval Sulphur & Potash co.

### Miss. River Chem. Facilities Completed

Completion of the \$16 million Mississippi River Chemical co. petrochemical plant, located on the banks of the Mississippi River at Selma, Mo., was expected early this month. The factory is designed for production of 200 tons anhydrous ammonia per day.

All products—ammonium nitrate fertilizer, nitrate solutions and anhydrous ammonia for agriculture, will be marketed under the company's Steamboat Brand trademark and will be distributed by Bradley & Baker.

Construction began last December following a mammoth earth moving job involving some 500,000 cubic yards. A special road, 1½ miles long, was built connecting with highway 61 for truck shipments and 1-8/10 miles of railroad siding was laid from the main line of the Frisco Railroad co.

### Bulk, Bag Sales at New Vorhes Plant

Bulk and bagged plant foods for sale through dealers will be produced at the new Vorhes Chemical corp. plant in Charles City, Iowa. Organized and incorporated last spring with a capital stock of \$200,000, the firm acquired a building to which considerable floor space has been added.

Production was expected to begin last month according to Harold Vorhes, executive vice president and general manager. Other officers include Ralph W. Zastrow, president; Robert Kerrigan, secretary; and Merten J. Klaus, treasurer.

### Davison Produces Pringle Fertilizers

Davison Chemical co. will take over manufacture of A. F. Pringle & co., inc. fertilizer, according to an announcement by L. L. Oliveros, vice president and treasurer of the Charleston, S. C., concern.

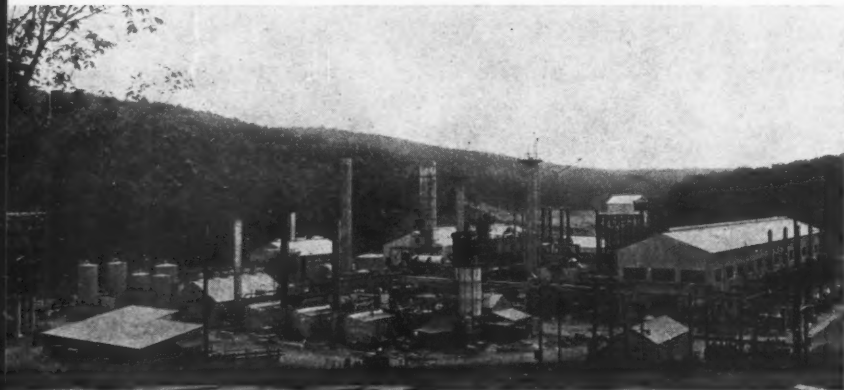
Although the Pringle company will discontinue production work on December 1, Oliveros reports that customers will continue to be served from the same offices by the same staff.

### Two-Way Radio for Simplot of Caldwell

Field-sales operations at Simplot Soilbuilders of Caldwell, Idaho, are now speeded through the use of two-way radio. Contact between field men and the Simplot office is maintained through five radio-equipped cars and trucks and a master transmitter-receiver.

Placing the antenna on top of a smoke stack at the adjacent company food plant cuts topographical interference to a minimum.

FARM CHEMICALS



Your eye tells you why

## *International's New Triple Superphosphate assures more* **complete ammoniation**

**O**NE look shows you why International's new Triple Superphosphate offers such a big advantage in ammoniation. Its improved fineness of texture; uniform, dust-free particles; and correct chemical structure assure maximum ammoniation in minimum time — help cut your manufacturing costs. International's new Triple Super is made by an improved process from high quality rock. Result: a high analysis product

(46% A.P.A. or better). Special conditioning before shipment helps prevent setting up en route. This, plus improved particle size, means less grinding before mixing, more economical handling, better texture in your finished products and high product performance. International's new Triple Super is ready for immediate delivery to your plant. Write or wire the Phosphate Chemicals Division for samples and quotations.



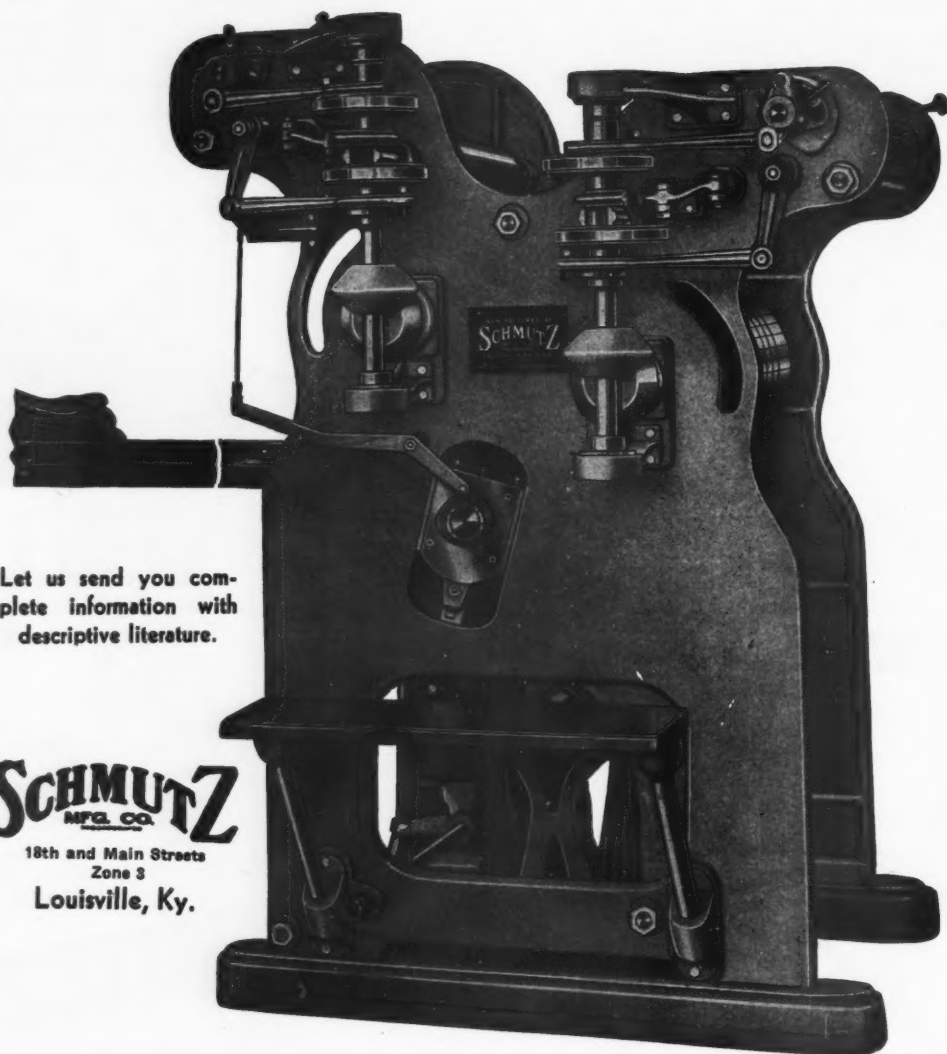
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OCTOBER, 1955

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because it's  
**FIRST in Design**

**New Model HA  
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**FIRST in Digging Capacity**  
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**FIRST in Carrying Capacity**  
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The 1955 Model HA "PAYLOADER" has gone to work in all kinds of manufacturing and processing plants and has already proven that it is a production champion. It has an 18 cu. ft. bucket—the biggest capacity in its class—and an amazing new bucket action. Long-time "PAYLOADER" users as well as new owners report new highs in production and new lows in bulk-material handling costs with the new HA.

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Your PAYLOADER Distributor is ready to show what the new HA can do on *your* bulk-material handling work.

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☐ On larger 2-wheel drive models

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City  
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State

Fc

## . . . Business & Management

### Begin West. States Cal. Fertilizer Plant

Western States Chemical corp. reports that construction has begun on its Nichols, Calif., fertilizer plant. The unit, scheduled to begin operations in early 1956, will have a capacity of 200 tons per day of pelleted complete plant foods.

W. L. Dixon, Jr., has been named general manager of the corporation and E. W. Rowbotham will serve as the Nichols plant manager. Products will be marketed throughout California by selected distributors.

### Spencer Sales Hit New High in '54-55

Spencer Chemical co. sales hit a new high during the year ended June 30, totalling \$36,154,921. Net income was down to \$5,118,454, however, because of non-recurring charges incident to placing the Orange, Tex., polyethylene plant on stream.

Commenting on the nitrogen outlook, Kenneth Spencer, president, anticipates "very satisfactory results for these products in the current fiscal year."

### Col.-Southern Signs 5-Year Labor Pact

A five year contract, believed to be the first of this length signed by a major chemical producer, has been signed by Columbia-Southern Chemical corp. and the union at its Barberton, Ohio, plant. It covers about 1,500 hourly employees of the Allied Chemical and Alkali Workers of America.

The contract calls for a 6 per cent basic increase the first year, three per cent each of the following three years, wage adjustments for skilled and semi-skilled employees, seventh holiday, in-

creased life insurance and improved pension plan, health and accident insurance, hospitalization benefits and vacation plan.

It is not subject to reopening during the life of the agreement and continues the no-strike clause in effect since 1947. The firm, during the past four months, has signed a three-year contract with no reopening at its Corpus Christi, Tex., plant and two year contracts at Natrium, W. Va., and Lake Charles, La., facilities.

### Joint Program for Grace Subsidiaries

Two W. R. Grace & co. subsidiaries—Davison Chemical co. division and Rare Earths, inc., Pompton Plains, N. J., have joined in a program of expanded production, sales, research and development of rare earths and thorium.

A plant is in operation at Pompton Plains for processing the materials from monazite sands, and added facilities are being installed at Davison's Curtis Bay works.



Cole

headquarters at Baltimore, Md., to coordinate Grace interests in industrial atomic energy. His unit will, among other things, investigate through research expanded industrial uses of rare earths.

Grace points out that monazite sands are about equal to phosphate rock in phosphate content and that in the processing sulfuric acid is used and recovered. Phosphoric acid is a by-product derivative.

### O-M NYC Offices Win Two Awards

Two awards were won by Olin Mathieson Chem. corp.'s New York offices in a competition conducted by MANAGEMENT METHODS magazine. One prize was for the "Best Special Situation Solution" and the other was for the O-M conference room.

Space in the functional office and reception area, basis of the first award, has been used to present an imposing picture of the company's products. Examples of many products are featured in a 64 foot gallery where glass in two-foot modules blends with white venetian terrazzo floor with inlaid polished brass strips, white milk glass, walnut and brass partitions and a row of pinpoint lights in the accoustical plaster ceiling.

The conference room incorporates a concave accoustical plaster dome covering most of the ceiling area, and, on one wall, a world map showing O-M holdings. Other features: Random-plank black flooring in the dining or meeting area; off-white nylon carpet in the television and lounge area; bathroom and service kitchen in the foyer.

### Davison Specialist at Mo. Bank Meet

Perry Onstot, Davison Chem. co., and John Falloon, Missouri extension soils specialist, were speakers at a recent farm soils and fertilization meeting conducted by the Pulaski County Bank, Richland, Mo. The affair was one of a series of Farm Forum meetings conducted in the interests of better farming as a public service.

Held in air conditioned facilities of the bank, the meetings were attended by some 150 persons each time. Light refreshments were served and a door prize was awarded each night.

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OF QUALITY NITROGEN  
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**Lion Nitrogen Fertilizer Solutions**—Various types to suit your particular manufacturing needs.

**Lion Sulphate of Ammonia**—White, uniform, free flowing crystals. Guaranteed 21% nitrogen.

Now that the new fertilizer manufacturing season is in full swing, make sure you realize all the profits your plant can produce. *Where you buy* your raw materials can be vital and now, more than ever before, it pays to buy *your nitrogen needs* from Lion—a leader!

Lion nitrogen products are manufactured under rigid controls to meet exacting specifications—ending the costly production delays that result when ingredients vary in quality from day to day. With Lion products, you produce with maximum efficiency and profit—and you maintain the quality standards your customers demand.

Lion also provides an expert technical staff to assist you in solving difficult formulation and processing problems. And, throughout the year, Lion's sales building advertising tells farmers the plant food story—for your benefit. Lion's leadership in customer service stands out, offering you outstanding opportunities for increased profits—and your best season yet!

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EL DORADO, ARKANSAS



### Another Net Sales Increase for IMC

An increase in net sales has been reported by International Minerals & Chemical corp. for the sixth consecutive year. Sales for the fiscal year ended June 30, were \$96,485,017 with net earnings of \$6,321,903.

Louis Ware, president, said that the higher volume resulted from sale of additional products manufactured in new facilities although earnings and sales were adversely affected by the Florida phosphate strike. Here's a brief resume on IMC's operating divisions:

**Phosphate Minerals**—profits up; strike kept sales from record high; increase due to improved mining and beneficiation efficiency.

**Potash**—sales and earnings higher with increased shipments from new and enlarged facilities; profit somewhat retarded by higher costs in certain operations.

**Plant Food**—better earnings from slightly lower shipments; increased sales of high analysis goods was the main factor.

**Industrial Minerals**—continued sales and earnings growth.

**Amino**—sales and earnings down due to decline in export business, new production of monosodium glutamate.

**Phosphate Chemicals**—sales up substantially but "burden on corporate earnings remained disappointingly large." On basis of current records, manufacture and sale of triple superphosphate will

greatly reduce or eliminate losses and eventual concurrent capacity production of this and dicalcium phosphate will soon be possible as sale of the feed ingredient increases and becomes more attractive with improved operations, lower costs.

### O-M Dealers Install Nelson Bulk Plants

Twelve new anhydrous ammonia bulk plants for Olin Mathieson Chemical corp., customers have been installed by Edward S. Nelson, Ltd. Representing a \$175,000 expansion program, most of the units are 30,000 gals. installations.

In Illinois, new plants are located at Red Budd, Barclay, Gerard, Muncie and Perrysville. Claude Simpson bought the Red Budd unit, Robert Westlake will operate from Barclay as the Westlake Fertilizer Service, George Kemp, General Feed Store, owns the Gerard unit and the other two operations are owned by Stanley Lusader of Perrysville, operating as the Lusader Fertilizer Service.

Three units are located in Indiana—one at Morroco, H. E. Barnett owner; at Marshall, Ray Steel owner; and at Warren, Harrison Implement co. Larry Wright, manager of the Breckenridge Farmers Elevator will operate a plant at Wheeler, Mich.

An 18,000 gal. installation at Fenimore, Wisc., will be operated as Nitrogen, Inc. and a 30,000 gal. plant at Cobb has also been erected. Both plants are owned by Joe Groenthal, Cross Plains, who also owns and operates a plant at his home location.

This 30,000 gal. anhydrous ammonia storage installation at Red Budd, Ill., is one of 12 recently completed by Edward S. Nelson for Olin Mathieson Chem. customers.

### Plant Dynamited in Phosphate Strike

In Florida, the phosphate strike continues against only International Minerals & Chem corp. of the original eight concerns involved. Workers at American Cyanamid made the most recent settlement, gaining a contract for benefits totaling about 8.5 cents per hour.

On August 29, the central control room of IMC's sulfuric acid plant at the Bonnie facilities was dynamited with resulting damage estimated at over \$50,000. IMC's executive vice president, James P. Margeson, Jr., announced immediately that a \$5,000 reward would be paid for information leading to arrest and conviction of the saboteurs.

Although two months may be required to repair the damage, temporary repairs requiring a week to ten days placed the plant back in operation.

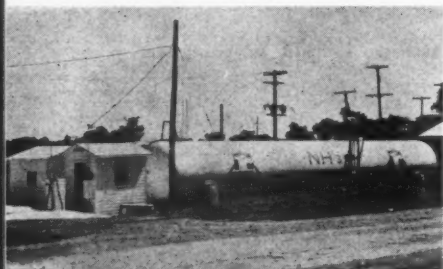
Fortunately, the supervisory crew was not yet on duty so personal injury was avoided.

Local 35 of the ICWU denied that union members were involved and, with its newspapers, joined IMC in offering rewards totaling \$6,000.

### New Publication by Davison's Sauchelli

Dr. Vincent Sauchelli, Davison Chemical co. agronomist, is the author of a new 32-page brochure titled, *Soils, Phosphates and Fertilizers*. It is written, says Sauchelli, for "salesmen, farmers and laymen in general to give in simple, understandable language some essential, practical information on the feeding of soils and crops."

For information on this publication write the Davison Chemical co., Div. of W. R. Grace & Co., Baltimore 3, Md.







# TRIPLE SUPER- PHOSPHATE

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2. GRANULAR FOR DIRECT APPLICATION
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It pays you, the dealer and the farmer to concentrate on the premium

# CASH IN ON THE SWING WITH THESE QUALITY

## SULFATE OF POTASH

High grade, low chloride *International Sulfate of Potash* can help you build a profitable volume of business on the premium fertilizers made for crops adversely affected by excess chlorides. Your farm customers will get improved quality and increased yields on high value crops such as tobacco, potatoes, vegetables, tree fruit and small fruit when they use fertilizers made with sulfate of potash. This quality plant food material is soluble, well conditioned and can be used without changing your present mixing processes.

At Carlsbad, New Mexico, *International* mines and refines these fine quality plant food materials for fertilizer manufacturers:

*Sul-Po-Mag*—Double Sulfate of Potash-Magnesia—22%  $K_2O$ —18%  $MgO$   
Sulfate of Potash—50%  $K_2O$  Minimum      Muriate of Potash—60%  $K_2O$  Minimum  
Muriate of Potash—Granular—60%  $K_2O$  Minimum



**potash division**

fertilizer grades needed for profitable production of many crops.

# TO PREMIUM FERTILIZERS POTASH MATERIALS



***Sul-Po-Mag***

*Sul-Po-Mag* enables you to produce premium grade fertilizers with a properly balanced combination of *two* essential plant foods: *sulfate of magnesium* and *sulfate of potash*. Both are water-soluble and readily available to growing crops.

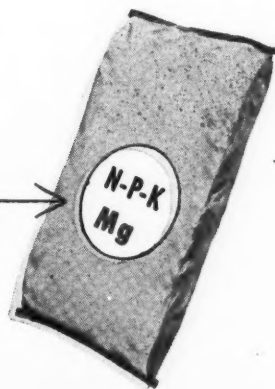
Agricultural experiment station studies show that the soils in many crop-growing areas are critically low or deficient in available magnesium. In fact, this nutrient is so important to profitable crop production, it's often called *the fourth element in the fertilizer bag*.

*Sul-Po-Mag* has been advertised consistently in farm papers for many years. You'll find a welcome market for premium grades containing *Sul-Po-Mag* for use on soils that are deficient in magnesium and potash. For many farmers know from experience it helps them increase crop production, increase quality and increase profits.

When you use *Sul-Po-Mag* in the bag, identify it on the bag . . . N-P-K-Mg tells farmers that yours is a premium fertilizer.

**PUT IT IN THE BAG**

**PUT IT ON THE BAG**



INTERNATIONAL MINERALS & CHEMICAL CORPORATION

General Offices: 20 North Wacker Drive, Chicago 6

OCTOBER, 1955

## ... Business & Management

### Programs Set For Control Officials

**A**NUAL conventions of the fertilizer and the pesticide control officials are scheduled to be held at the Shoreham Hotel, Washington, D. C. on October 14 and 15, respectively.

Special papers to be delivered before the Association of American Fertilizer Control Officials include "New Developments in the Manufacture of Fertilizer," Dr. E. C. Kapusta, U. S. Potash co.; "Plant Food Research as Related to Fertilizer Practices," Dr. J. B. Pitner, Grace Chem. co.; "Ratios and Multiple Grades as Related to Soil Testing," Dr. J. Fielding Reed, American Potash Institute, inc.; "Complete Liquid Fertilizers," R. B. Ellsworth, R. B. Ellsworth & Assoc.; "Acquainting the Public with Our Program," W. C. Winton, Oklahoma Dept. of Agriculture; and "Distribution of Bulk Fertilizer in 1953-54," Walter Scholl, Hilda M. Wallace & Esther I. Fox. Paul T. Truitt, executive vice president of the National Plant Food Institute is also scheduled to appear on the program.

For the Association of Economic Poisons Control Officials, the program includes a talk by C. O. Barnard, executive secretary, Western Agricultural Chemicals Assn., on "Safety—Problem Child of the Pesticide Industry in the West." Dr. Bernard E. Conley of the American Medical Association will also address the group.

Of special interest at the pesticide officials meeting will be a report by the special committee appointed last year to consider the definition of "pesticide." The three members of this group are Allen B. Lemmon, Joe Noone and H. L. Haller.

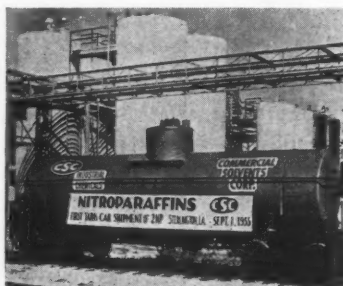
Industry sponsored dinners will be held for both control groups,

with the National Plant Food Institute honoring those in the fertilizer field on the evening of October 13, and the National Agricultural Chemicals Association, Western Agricultural Chemicals Association, Interstate Manufacturers Association and Chemical Specialties Manufacturers Association combining to entertain the pesticides group the following evening.

A states relations meeting is scheduled for each group following its respective industry dinner.

### CSC Nitroparaffin Plant in Operation

J. Albert Woods, president, Commercial Solvents corp., has announced initial operation of the world's first full scale nitroparaffin facilities located at CSC's



Sterlington, La., plant. Shipments of nitromethane began on September 7, and full scale production of three other NP's is now under way—nitroethane, 1-nitropropane and 2-nitropropane.

Of primary value initially to the textile, surface coatings, petroleum and chemical specialties industries, Woods says that the NP's will also be utilized in the manufacture of pesticides.

### Delta Butane Gas & F At New Location

Delta Butane Gas & Fert. co. is reported open for business at its new location, 605 Walnut St., Helena, Ark.

### Marquiss Completes Liquid Fert. Course

Marquiss Farm Supply, Decatur, Ill., reports completion of its first training program in manufacturing Marco liquid fertilizer. A three day affair, the students are instructed in formula calculation, laboratory work and preparation of the plant foods.

### Student Work Plan Continued by AP&C

This summer, 30 students from 12 colleges and universities were employed at American Potash & Chem. corp.'s main plant at Trona, Calif., where they received a preview of careers with a major chemical company.

The plan was initiated on a formal basis about five years ago and has been so successful that company personnel are now sent to advanced institutions throughout the West to get acquainted with teachers and students.

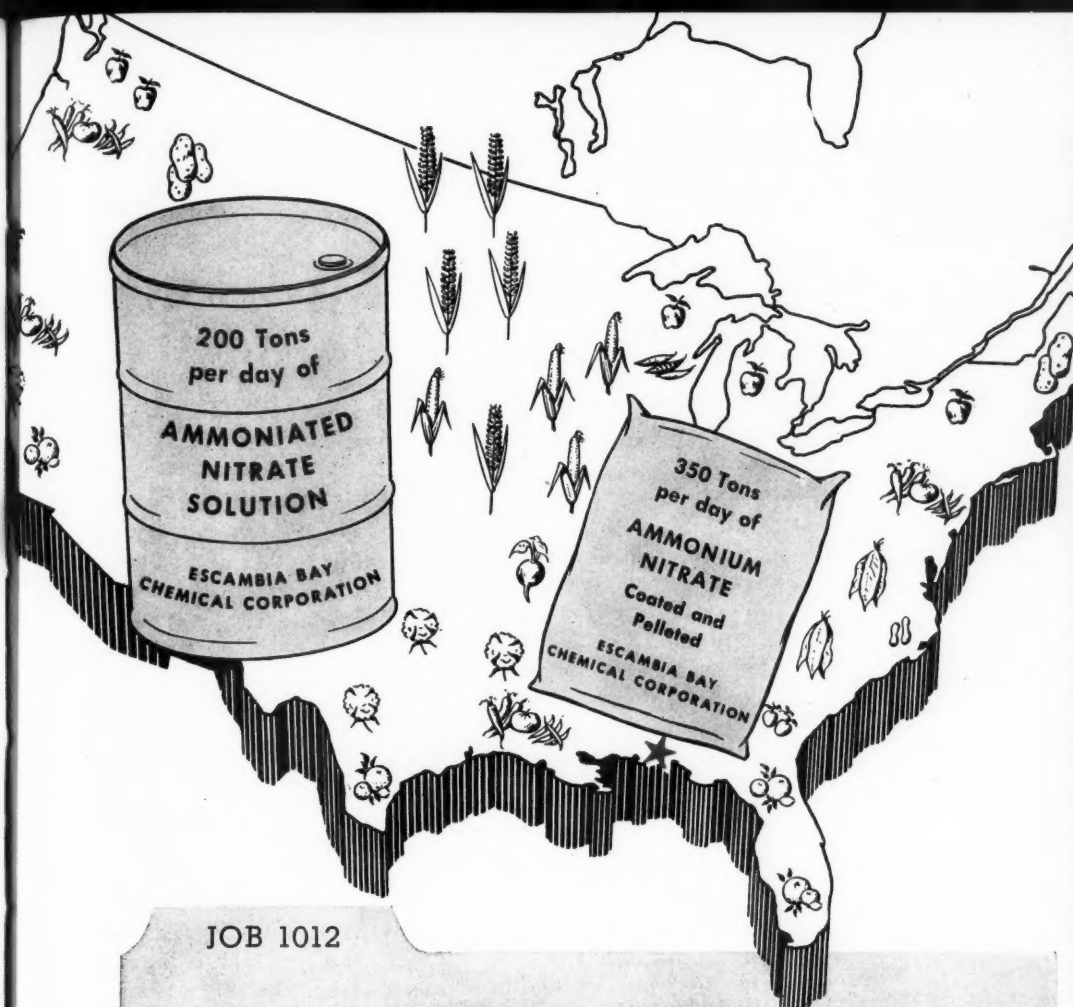
### Probe of Dumping Charges Dropped

No present injury or likelihood of injury to domestic industry was reported by the Tariff commission following its investigation into nicotine sulfate dumping charges against N. V. Alhamex, Amsterdam, Netherlands.

### Conference on Farm Use of Antibiotics

October 19-21 the National Academy of Sciences-National Research Council will sponsor, in cooperation with the Agricultural Research Institute, the first International Conference on the Use of Antibiotics in Agriculture. American Cyanamid co., Merck & co., Chas Pfizer & co. and E. R. Squibb & co. are supporting the affair.





JOB 1012

# A Complete Integrated Fertilizer Plant

*designed and now being constructed*

by **CHEMICO** for  
**Escambia Bay Chemical Corporation**  
**at Pensacola, Florida★**  
**to help America produce better crops**

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# CHEMICO

## PEOPLE

**American Potash & Chemical corp.** Two additions to Eston Chemicals div. Engineering dept.: Rudy Peterson has joined the firm as senior process engineer and Karl Wahl was named as a technical assistant.

William M. Clines, western sales manager of heavy chemicals for AP&C, has been elected president of the Chemical Research Market Assn. of Southern California.

**Brea Chemicals, inc.** Carlton L. Horine, is named senior process engineer for the firm's Development dept. at Brea, Calif.

**California Spray-Chemical corp.** Recently appointed branch manager for the Virginia area is William R. Hawk, former Cal-spray sales representative. The company has also named Andrew J. Von Rembow assistant to the district manager at its Whittier, Calif., office. Prior to his recent appointment, he was a sales specialist at the Richmond, Calif., home office.

**Dicalite div., Great Lakes Carbon corp.** Joseph E. Moran, general sales manager since 1948, has been appointed assistant general manager of the division. Since 1951, Moran also has been president of The Dicalite co., sales agency for the division in certain areas.

**Food Machinery & Chemical corp.** Lloyd C. Hartman, counsel for the chemical divisions, has been promoted to general counsel of the corporation with headquarters at San Jose, Calif.

**Grace Chemical co.** Former head of the Clemson Agricultural College Agronomy dept., Dr. John B. Pitner, has been named

manager of agricultural service for Grace Chemical. He will be in charge of the company's agricultural service program,



Pitner

including grant-in-aid research programs in various state agricultural experiment stations, dealing with nitrogen fertilization of crops, and with protein nutrition of ruminant animals.

**Lion Oil co.** New assistant general manager of chemical sales is Bernard M. Machen, district chemical sales manager at Montgomery Ala., since 1949. He will have his headquarters in El Dorado.

**Michigan Chemical corp.** Walter Gibbs has been appointed purchasing agent for the firm. Since joining Michigan Chem. in 1935, he has been with the Operations and Maintenance depts., and recently served as acting purchasing agent.

Transfer of Carl H. Pfrommer, assistant director of operations, to New York City where he will join the staff for sales and sales service assignments there and in New England also was announced.

**Olin Mathieson Chemical corp.** William F. Watkins, agriculturalist with the Eastern Fertilizer div., has been named agronomist for the Great Lakes sales district with headquarters at Lafayette, Ind. In



Watkins

his new position Watkins will provide advisory and research services on agronomy in connection with the sale of Olin Mathieson's fertilizers, pesticides and irrigation.

**Pacific Coast Borax co.** Appointment of two additional sales representatives in the US for the Agricultural Sales div. has been announced. Joseph S. Gowland is assigned to the Chicago office to handle the division's products in a portion of Illinois, Indiana and lower Michigan, and Elmer H. Schmierer will work out of the district office at Kansas City, Mo., doing sales contact work in Nebraska and Missouri.

**Pittsburgh Coke and Chemical co.** The Research and Development dept.



Parr

has appointed Thaddeus Parr to its staff. An entomologist, Dr. Parr will serve as advisor to the firm's agricultural chemicals research group and will assist the Agricultural Chemicals div. on field testing and sale of insecticides. He was associated with Pennsalt from 1945 until his present appointment.

**Shell Development co.** Associate director of research at the Emeryville, Calif., research center, S. H. McAllister, has been named director of the company's Agricultural Research div. in Denver, effective Sept. 15.

**J. R. Simplot co.** William R. Burgess has been named manager of midwest sales for Simplot Fertilizer div. He is succeeded as manager of the Simplot Soil-builders unit at Greeley, Colo., by Larry Schumacher, former manager of a branch unit at Swink, Colo. Burgess will continue to make his headquarters at Greeley.

**Smith-Douglass co.** Two employees with a total of 51 years service have retired at the Norfolk, Va., plant. President Ralph B. Douglass (left) was on hand to congratulate

(to page 23)

# These Crushers Give Double Service!



Williams Heavy Duty  
Reversible Hammer Mill for top  
output of crushed stone, clay, shale  
and all other heavy abrasive materials.

## **WILLIAMS** *Reversible* **HAMMER MILLS**

Double service from hammers, breaker plates and grate bars—maintenance reduced to half or less—downtime cut as much as 50%—these are only a few of the money-making, time-saving features of Williams Reversible Hammer Mills.

Operation either clockwise or counter-clockwise with a reversible motor promises that hammers and other internal parts will work twice as long without even opening the machine. Slower and more even wear results in continuous peak output of a uniformly high quality product while, at the same time, demanding the very minimum of time and expense in the replacement of worn parts.

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Impactors



Helix-Seal Mills



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Air Separators



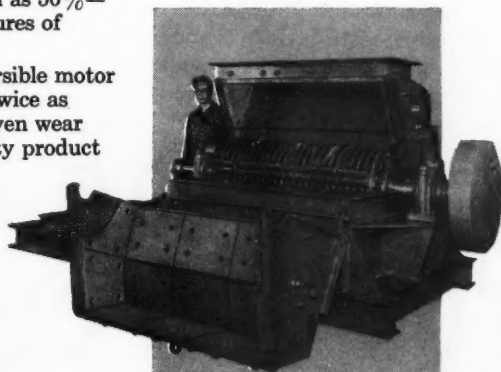
Vibrating Screens



Feeders

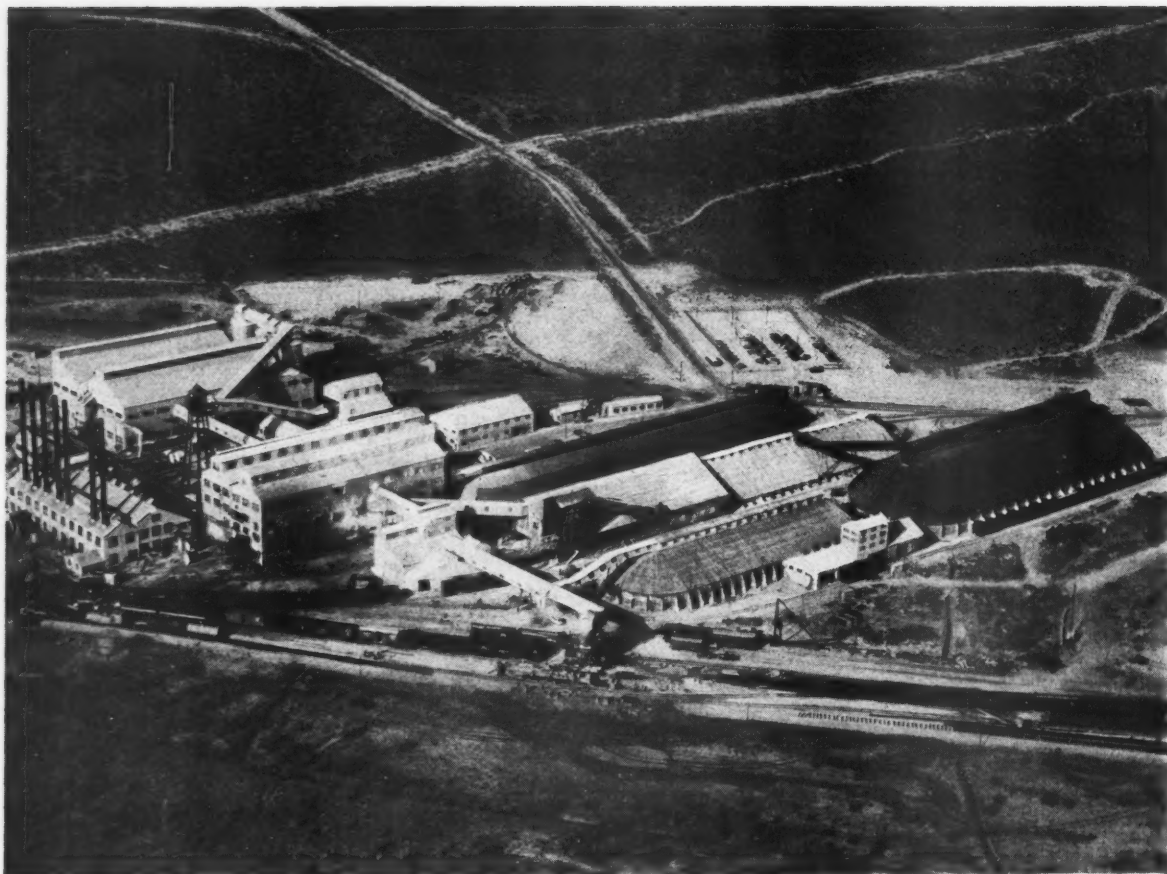


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Open view of Reversible Hammer Mill. Note heavy shock-proof, wear-resistant manganese steel liners and breaker plates, and the rugged, reinforced construction. Entire interior easily, quickly accessible. Rotor removable without disturbing feeder or feed chute.





The heart of USP's extensive operations is at Carlsbad, New Mexico. This ultra-modern plant stands at the site of the great potash mines in one of the most colorful sections of the Southwest.

EXTRA WAREHOUSES  
EXTRA PROCESSING MACHINERY  
EXTRA HANDLING FACILITIES

# ADD UP TO EXTRA SERVICE FOR OUR CUSTOMERS

**THE RECENT ADDITIONS** to our plant facilities, completed early this year, were made primarily to improve delivery of our products to customers during peak months.

As a result, we have been successful in keeping deliveries completely up to date throughout the year.

Just as a good farmer returns part of his income to the earth in the form of fertilizers to assure better crops, so we have returned part of our income to increased plant facilities that will assure faster, more efficient service to our customers.

HIGRADE MURIATE OF POTASH 62/63%  $K_2O$   
GRANULAR MURIATE OF POTASH 60%  $K_2O$  MIN.



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INCORPORATED

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Southern Sales Office

Rhodes-Haverty Building, Atlanta, Georgia

FARM CHEMICALS



## ... People

(from page 20) and thank (left to right) F. M. Edwards (18 years) and George T. Wood (33 years) with Robert B. Rowland, who hired both men. Wood, one of Smith-Douglass' oldest em-



ployees in length of service, was a Norfolk factory salesman, and Edwards a maintenance foreman. Both retired under provisions of the company's pension plan.

**Velsicol Chemical corp.** C. E. Campbell, former director of



**Campbell**

research extension for United Fruit co., has been named technical representative for the Washington, D. C., area by Velsicol. Campbell, who will reside in Bethesda, Md., will be responsible for maintaining contact between his firm and the various agencies of the Federal government.

**Virginia-Carolina Chemical corp.** Four directors were recently elected: George Champion, executive vice president, Chase Manhattan Bank; Edward Bartsch, former president, Rayonier corp.; Rupert T. Zickl, vice president, Bartram Brothers corp.; and Horace A. Gray, Jr., chairman, Virginia Folding Box co.

Newly appointed assistant director of the company's Research dept. is Dr. Russell J. Rowlett, Jr.

OCTOBER, 1955

## CONSTRUCTION

### Calspray Adds Wing To Richmond Offices

A contract has been awarded to C. Overaa and co. for construction of a new wing on the present California Spray-Chemical corp. administration building. Construction was started Aug. 15.

When finished, the wing will include new offices for the company's top management as well as improved facilities for the Manufacturing dept., Merchandising Sales, Foreign Sales and Fertilizer Sales div.

Also planned are enlarged quarters for Calspray's engineering staff and machine accounting group, as well as a new conference room. In all, the wing will add 8,000 sq. ft. of floor space to the company's present facilities.

This is part of a multi-million dollar expansion program which will also include a \$16 million fertilizer plant and two new research labs.

### Plan First Puerto Rico Nitrogen Plant

Construction will begin shortly on a new anhydrous ammonia, sulfuric acid and ammonium sulfate plant at Guanica, Puerto Rico, for Gonzales Chemical Industries, inc., San Juan. The installation was designed and will be built by The Lummus co.

To be Puerto Rico's first complete ammonia products plant, it will produce 42,000 tons of anhydrous ammonia per year. Part will be sold as such, and the balance converted to aqueous ammonia, sulfuric acid, ammonium sulfate and possibly other materials.

Artists' conception of Gonzales nitrogen plant at Guanica, P. R.

### Three V-C Plants For the Midwest

Plans for construction of three new fertilizer plants in the midwest have been announced by Virginia-Carolina Chemical corp. Designed for the production of high analysis V-C fertilizers, the plants will be located at Orrville, O.; Remington, Ind., and Estherville, Iowa. In making the announcement, the company said it plans to start construction immediately and expects each of the plants to be in production by next spring.

Founded in Richmond, Va., in 1895, V-C celebrated its 60th anniversary in September.

### Darling & Co. Adds Granulation Unit

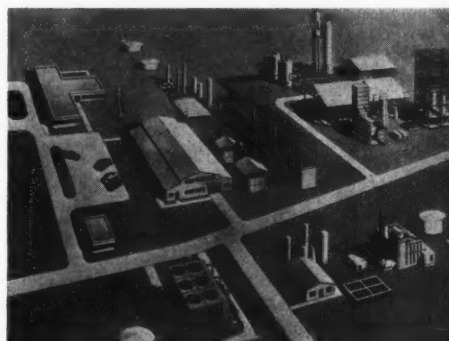
Darling and co. is installing a new granulating unit at its East Saint Louis, Ill., plant. Construction is well underway, with operations planned for early fall.

The unit is being designed and furnished by the D. M. Weatherly co.

### Michigan Chemical Increases Output

Michigan Chemical corp. reports it plans to enlarge considerably the capacity of its Saint Louis, Mich., magnesite plant.

Besides increasing volume, the plant additions will provide ways and means of adding product types which will permit diversification of its magnesium oxides into wider markets.



# GOVERNMENT

## Potato Diversion Backed by USDA

In states or areas where the potato industry develops and operates an approved plan, USDA reports it will make payments for diversion of potatoes into starch, feed or flour. Payments will be 50 cents per hundredweight for 1955 crop potatoes until Dec. 31, 1955; 40 cents per hundredweight through March 31, 1956 and 30 cents per hundredweight during the remainder of the season but not later than June 30.

## Quotas Favored by Tobacco Growers

Final returns from the flue-cured tobacco marketing quota referendum, held July 23, show that the percentage of growers voting favorably remains at 97.3 per cent, USDA reports.

Of the 200,444 growers voting, 95.5 per cent favored quotas for the next three years, and 1.8 per cent favored quotas for one year only. Since more than the necessary two-thirds voting favored the three year quotas, the program will continue in effect for the 1956, 1957 and 1958 crops of flue-cured tobacco.

## TVA Extends Eight AES Fert. Contracts

TVA recently announced a five year extension of its fertilizer research and testing contracts with agricultural experiment stations in eight states—Alabama, Georgia, Mississippi, Tennessee, Virginia, North Carolina, Kentucky and Washington.

In general, the contracts provide for testing TVA fertilizer in

laboratory, greenhouse and field experiments to determine the efficiency of the products.

At the close of the 1955 fiscal year on June 30, TVA said there were 2,893 active test-demonstration farms in its fertilizer program, of which 527 were established during the year.

Farmers engaged in demonstration operations obtain TVA fertilizer on a partial payment plan, paying about 30 per cent of the f.o.b. plant price for phosphate fertilizers, plus freight and handling charges. Nitrate fertilizers are made available at full wholesale price and are supplied for any suitable use.

## FTC and Na-Churs Reach Agreement

FTC reports that "Na-Churs" Plant Food Co., Marion, O., has agreed not to represent that "Na-Churs" liquid fertilizer is a new plant food and more effective than any other fertilizer.

Other provisions contained in a stipulation signed by the firm prohibit representations that the product will assure an increase in growth or yield of plants regardless of other factors or conditions; nutrients of "Na-Churs" are absorbed faster and more efficiently through the leaves than through the roots, or that leaf feeding is superior to root feeding; all ingredients are absorbed when the product is applied on foliage; the product will not burn plants unless expressly limited to its use as directed; it is substantially different from other liquid fertilizers on the market.

The commission said that this stipulation is for settlement purposes only and does not constitute an admission by the company that it has violated the law.

## ICA Authorizations

**China** (Formosa) \$47,700—agricultural pesticides (PIO/C No. 84-19-008-6-50319). Contract period—Aug. 20 to Dec. 31. Source—USA & poss. Ending delivery date—Feb. 29, 1956. Procurement will be carried out through Central Trust of China.

**US Program for Korea** \$9,000,000—fertilizer (PA No. 89-230-99-A6-6001). Contract period Aug. 1-Oct. 31. Source—World wide. Ending delivery date—Jan. 31, 1956.

**Indonesia** \$12,500—agricultural pesticides (PIO/C No. 97-11-004-5-50179.1). Source—USA & poss. Ending delivery date—Dec. 31. Procurement through Emer. Proc. Serv., GSA.

\$35,000—nitrogenous (\$22,000) phosphate and other fertilizer materials (\$13,000). (PIO/C No. 97-11-004-5-50229). Source—World wide. Ending delivery date—Dec. 31. Procurement through EPS, GSA.

## Pest Control Display at Minn. State Fair

The Minnesota Div. of Plant Industry and Office of State Entomologist displayed an exhibit of insect and weed control at the State Fair. Staff members were in attendance to answer questions and discuss problems relating to their work.

## Olin-Math. Grant in Aid to Texas A & M

Studies have been undertaken by the Department of Entomology of Texas A&M College to evaluate new formulations of high analysis insecticides, R. D. Lewis, director, has announced. If successful, the evaluations will provide more effective control of cotton insects. Work is being done under a grant of aid provided by Olin Mathieson Chemical corp.

FARM CHEMICALS

## Associations & Meetings

### New TV Films, Radio Recordings by NPFI

A new TV film, a recording for radio and the 10th in a series of recorded Farm Radio News Service have been announced by the National Plant Food Institute.

"From the Ground Up" is the name of the 13½ minute film, which is being produced in cooperation with USDA's Soil Conservation Service, to emphasize the importance of conservation in relation to soil fertility.

Dr. Russell Coleman, executive vice president of NPFI, last week completed a recording for the Board of Trade of Chicago, to be used by about 500 radio stations on "The Efficient Use of Fertilizer." The broadcast will be heard during the fall.

The 10th in the News Service series includes four three-minute talks, by Dr. Byron T. Shaw, administrator, ARS, USDA, "Research—Money in the Bank;" D. A. Williams, administrator, SCS, USDA, "Soil and Water Conservation;" Dr. Robert E. Wagner, research agronomist, ARS, USDA, "Pastures—Challenge Across the Country;" and Oris V. Wells, administrator, AMA, USDA, "Better Foods and Better Living."

### Chem. Progress Week Termed a Success

By every standard, the second Chemical Progress Week, held May 16-21, 1955, was a success, states the Manufacturing Chemist's Association in its recent report on the week.

The following totals have been reported to date: 1,704 speeches before 186,545 people; 2,339 CPW stories in 815 publications, 258 shows on 115 television stations; 2,079 radio programs or mentions

on 255 stations, 447 plant visits with 42,222 visitors; 14,529 CPW posters were used; 210 proclamations were issued, including 26 by state governors.

MCA said that new material and ideas are now being developed for 1956.

### Benson Reports on 1954 ACP Program

In his report on USDA activities in 1954, Secretary Benson indicates that about 2 million farms and ranches participated in the Agricultural Conservation Program, the National Agricultural Lime Institute recently reported.

While figures are not yet available for 1954, current indications are that total usage of lime dropped between 5 and 10 per cent and that the entire reduction will be reflected in the report of tonnage used in connection with the program, NALI states.

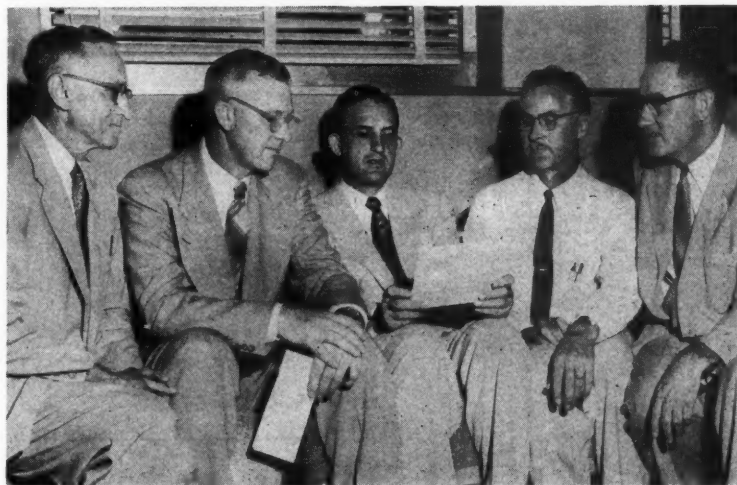
### Program Announced For WACA Meeting

At Hotel Claremont, Berkeley, Calif., on Oct. 11, members attending the Western Agricultural Chemicals Association meeting will hear three speakers after luncheon: Dr. Rosmarie von Rumker, Chemagro corp., on "Inter-Relations Between Basic and Applied Research in the Development of Modern Insecticides;" R. H. Rollins, assistant chief, Bureau of Chemistry, California Dept. of Agriculture, on "The Responsibilities of Pesticide Salesmen;" and a third speaker (to be announced) will discuss "Salesmanship and Sales Management."

### N Solution Group At Springfield, Ill

On October 13 and 14, the National Nitrogen Solution Association will hold a meeting and equipment display in the Illinois State Armory, Springfield, according to an association director, W. H. Schelm of Schelm Brothers, Inc.

### Speakers at Kentucky Conference



Speakers at the annual fertilizer meeting held at the University of Kentucky, Aug. 10, Prof. P. E. Karraker, Univ. of Kentucky; Dr. J. H. Lilly, Iowa State College, and Dr. Russell Coleman, National Plant Food Institute. Also shown are G. T. Webster, head of the Univ. of Kentucky Agronomy dept. and Bruce Poundstone, head of its Dept. of Feed and Fertilizer.



## Chemical Industries Exposition of Phila.

The 25th Exposition of Chemical Industries, to be held at Philadelphia Dec. 5-9, is scheduled to display models of complete manufacturing plants, processing equipment powerful enough to convert the toughest minerals to finest powders and instruments so delicate as to record temperatures within the human brain while an operation is being performed.

Advance registration and hotel reservations may be secured by writing the International Exposition Company, 480 Lexington Ave., New York City 17.

## Ill. Student Group Named Best in US

The agronomy club of the University of Illinois has been named the best student agronomy organization of its kind in the US and winner of a trophy and \$100 presented by the National Plant Food Institute.

Known as the Field and Furrow Club, the group received the National Agronomy Achievement Award for 1955 at the American Society of Agronomy's annual meeting in Davis, Calif. on Aug. 17.

The club, which has 75 active undergraduate members, is one of 39 such student organizations at leading agricultural colleges of the country.

## Calendar

**Oct. 3-5.** Carolinas-Virginia Pesticide Formulators Assn., inc., annual meeting, Holly Inn, Pinehurst, N. C.

**Oct. 11.** Western Agric'l. Chem. Assn., annual meeting, Hotel Claremont, Berkeley, Calif.

**Oct. 13-14.** National Nitrogen Solutions Assn. Meeting & Equip. Display, Illinois State Armory Springfield, Ill.

**Oct. 17-18.** Fertilizer section, National Safety Congress, LaSalle hotel, Chicago.

**Oct. 18-20.** Canadian Entomological Society of America, Fredericton, B. C.

**Oct. 24.** Salesmen's Assn. of the American Chem. Society, 4th annual sales clinic, Roosevelt hotel, New York City.

**Oct. 27.** Middle West Soil Improvement Committee annual business meeting, Sherman hotel, Chicago.

**Nov. 2-3.** Annual convention, Pacific Northwest Plant Food Assn., Pilot Butte Inn., Bend, Ore.

**Nov. 3-4.** Northeastern div., American Phytopathological Society, Eastern Farmers Exchange, Inc., 27 Central St., W. Springfield, Mass.

**Nov. 4.** Fertilizer section, S. C. annual Accident-Prevention conf., Hotel Francis Marion, Charleston, S. C.

**Nov. 7-8.** Calif. Fert. Assn. 32nd annual convention, Hotel Mark Hopkins, San Francisco, Calif.

**Nov. 8-10.** 17th annual New York State Insecticide and Fungicide and Application Equip. Conf., Bibbins Hall, GLF Exchange, Ithaca, N. Y.

**Nov. 8-11.** American Council of Independent Laboratories annual meeting, Westward Ho hotel, Phoenix, Ariz.

**Nov. 29-Dec. 2.** Entomological Society of America, Netherlands Plaza hotel, Cincinnati.

**Dec. 5-9.** Exposition of Chem. Industries, Convention Hall, Philadelphia, Pa.

**Dec. 5-7.** Agric'l Ammonia Institute, Kansas City, Mo.

**Dec. 5-7.** Chemical Specialties Mfrs. Assn., annual convention, Roosevelt hotel, New York City.

**Dec. 8-9.** Michigan Fert. & Lime conference, Michigan State College, East Lansing.

**Dec. 15-16.** Beltwide Cotton Prod. conf., Hotel Peabody, Memphis, Tenn.

**Dec. 28-30.** American Phytopathological Society of America, Atlanta, Ga.

**Jan. 4-6.** Weed Society of America, Hotel New Yorker, New York City.

**Jan. 10-11.** North Carolina Pesticide School, Raleigh.

**Jan. 16-18.** N. W. Vegetable Insect Control conference, Imperial Hotel, Portland, Ore.

**Jan. 16-18.** Southern Weed conf., 9th annual meeting, Hotel Jung, New Orleans, La.

**Jan. 18-20.** Western Coop. Spray Project, Imperial hotel, Portland, Ore.

**Jan. 24-26.** Midwestern Garden Supply Trade Show, International Exposition hall, Chicago.

**Jan. 26-29.** Agric'l. Aircraft Assn., 6th annual convention, Wilton hotel, Long Beach, Cal.

**Feb. 7-9.** N. Y. Garden Supply Trade Show, Kingsbridge Armory, New York City.

**Feb. 15-17.** Calif. Weed Control conf., Sacramento & Davis, Calif.

**Feb. 15-17.** Western Weed Control conf., Sacramento & Davis, Calif.

## AMA Chem. Health Hazard Symposium

A symposium on health hazards of chemicals will be sponsored by the Committee on Toxicology of the American Medical Association on Dec. 29 in Atlanta, Ga.

Bernard Conley, secretary of the AMA Committee on Pesti-

cides, which is co-sponsoring the discussion, will be moderator. He said purpose of the meeting is to interpret new knowledge of chemical products to scientists in various fields so they may in turn use and spread the information.

On the symposium will be Lester M. Petrie, director, Preventable Diseases Services, Ga. Dept. of Public Health; Wayland J. Haynes, chief, Toxicology section, Communicable Diseases Center, US Public Health Service; Irvin Kerlan, associate medical director of FDA; and Mrs. Veronica Conley, assistant secretary, AMA Committee on Cosmetics.

**Dr. W. H. Garman, chief of agronomic relations for NPFI, presents silver trophy and \$100 to Duane Swarts, president of the winning club, while M. B. Russell, club adviser and dept. head, looks on.**







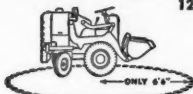
## Speeds unloading of box cars

This Jaeger Auto-Scoop is working as a car unloader at American Cyanamid Company's Piney River, Virginia plant, handling sulphur and/or copperas. Designed to work in cramped quarters, it's ideal for this and other jobs. The Auto-Scoop moves a bigger load, turns shorter, carries faster, can dump higher and farther than comparable 12 cu. ft. loaders. Many other advantages that bring production gains, cut costs. Write for Catalog L12-4.

### JAEGER LOAD-PLUS auto-scoop



Low bucket tilt-back assists full-bucket loading, permits carrying as low as 4 1/2" from ground.



5" shorter turning radius (6'6"). Faster speeds to 13.88 mph in reverse, 7.66 forward.



Higher clearance (6'8"), more reach (2'7").

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CORN  
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**FRUIT  
VEGETABLES**

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WEED CONTROL  
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SOIL FUMIGATION

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Over 400 interchangeable orifice tips to fit any TeeJet Spray Nozzle . . . give you a choice to meet the need of any crop and any type of spraying. Tip types include flat spray, hollow cone, full cone, and straight stream. Try TeeJet Spray Nozzles . . . proved best in the field . . . guaranteed for exact performance.



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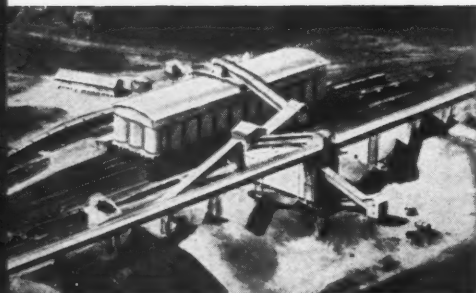
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Gelatin Bone Products Salt Cake Ammonium Carbonate

Sulphuric Acid Fluosilicates Insecticides and Fungicides

Phosphoric Acid and Phosphates

Phosphorus and Compounds of Phosphorus



From the air—wet rock storage and drying plant, with dry rock storage silos in background. These silos, 29 in number, have a total capacity of 40,000 tons of dried rock. Under the silos are four runways where 40 railroad cars can be loaded at a time.

**THE AMERICAN AGRICULTURAL CHEMICAL COMPANY**

GENERAL OFFICE: 50 CHURCH STREET, NEW YORK 7, N. Y.

30 FACTORIES AND SALES OFFICES, SERVING U.S., CANADA AND CUBA—ASSURE DEPENDABLE SERVICE

# Washington Report

By John Harms

- '56 ag program to emphasize cash for farmers
- Benson's new industry—agriculture approach
- NACA forms Miller bill liaison committee

- A new farm program now is expected to be written—and put into effect—in 1956. This is the consensus of farm leaders in Washington, inside and outside the government.

And bluntly, the aim is to provide the farmer with more cash—as fast as possible. That is the spoken and implied aim of both major political parties. Both parties need a new program as bait for the farm vote. Both are pushing this as their number one issue in the coming election.

Regardless of the politics of the matter, farm program action next year will tend to make available more spendable income in farm areas. The implication to the farm chemicals industry is obvious.

What kind of law eventually will get on the books? It's, of course, too early to tell. But you get some idea of the direction this legislation might take from preliminary plans of both parties.

The Administration is working on a program of payments to farmers who remove fertile acres from cash crop production of any kind. This is the "sugar-coating" we told you about last month. Question is whether to make it mandatory by making compliance a measure of eligibility for price support, or by making payments high enough to get substantial voluntary cooperation. The odds favor a voluntary program, even though cost would be high, since a price support tie-in would constitute "distasteful" regimentation.

The Democrats will come up with a big plug for the "Brannan Plan" under which the government pays farmers directly the difference between "free" market prices and an estimated "fair" price. They claim that this program would not cost more than the present price support set-up. A program along these lines was approved by Congress last year for wool and signed into law by the President.

The Democratic Congress can be expected to load the 1956 omnibus farm bill with everything "except the kitchen sink." Idea will be to get Ike to veto. Actually, the President may find enough of what he considers worthwhile legislation in the package to argue against a veto. This turn of events may serve to reduce agriculture as a campaign issue . . . since both parties would have had a hand in the new program.

From this early date, Washington insiders believe that the 1956 farm act will finally contain elements of both parties' proposals . . . including the land retirement payment program, Brannan Plan-type direct payments on limited crops, and perhaps more rigidity in price supports for other crops.

If the farm program does turn out a patchwork of "emergency" measures such as that, it undoubtedly will cost the Treasury more money. Will this unbalance the U. S. budget? Indications are that it will help—especially if taxes also are reduced. But this is considered expedient in a big election year.

- Secretary Benson has taken what looks like a new approach to the relation of industry generally to agriculture specifically. He says that industries sell-

ing to the farm market should become better acquainted with the farmers' problems and operate their policies accordingly.

**In a recent speech before the Farm Equipment Institute**, the Agriculture Secretary indicated that some industries . . . and unions . . . were profiting at the expense of farmers. He said:

" . . . I tell you in all honesty that most farmers will find it extremely difficult to take an increase in farm machinery prices at this time. During the past 4½ years they were squeezed between inflexible high operating costs and declining farm prices.

**"Throughout this period a considerable part of the increased profits that have gone to industry and the higher wages that have gone to labor have been siphoned from the economic bloodstream of the Nation at the expense of agriculture."**

**Mr. Benson goes on:** "I have always believed in good wages, good farm prices and just profits. I also believe that the three go together—that whenever anyone of these components gets out of line, it adversely affects the others. There isn't any question that farm prices today are out of line with profits and wages.

"If I were an equipment manufacturer, I would give serious thought, as I am sure you are, to the immediate consequences which would stem from a cutback in purchases of farm machinery. If I were a worker in a farm equipment plant, I would give some consideration to the economics of this situation, too."

**The Secretary adds:** "It is not for me to say what labor or industry should do at this juncture. But as a spokesman for agriculture in the federal government, I will say that I am deeply disturbed by any action which adds even one penny to the production costs of farmers at this time." (Some farm equipment firms, says he, have announced intentions to boost prices about seven per cent.)

**To say the least**, this is a new tack by the Secretary and one of extreme interest to all industry involved in agriculture.

- **The National Agricultural Chemicals Association has established a Million Law Liaison Committee** to act as a contact unit between the industry and the Food & Drug Administration and Department of Agriculture. The Committee will confine itself to determining issues for study by other specialized groups rather than to resolve them. It will tend to further the cooperation between industry and the government in solving problems expected to come up in the future in developing standards and procedures under Miller Bill amendment.

- **A recent Agriculture Department survey shows that only 1/6 of all U. S. cropland was dusted or sprayed** against weeds, diseases and insects in 1952. Total cropland is estimated at around 350 million acres. Crop losses took place mainly in non-treated areas. It was estimated in that year at \$7.5 billion.

**According to the figures**, 48 per cent of cotton acreage was treated for insects; 75 per cent of the potato acreage; 79 per cent of the tobacco land; and only half of 1 per cent of the field corn acreage. About 12 per cent of the small grain crops, and 11 per cent of the field corn was sprayed to control weeds.

**A total of 31 million acres of farmland** were treated for weed and brush control and 29 million acres were treated for control of insects and diseases. Only 3 million acres were treated both for insects and diseases, and for weeds.





## "Best time-saver I know of

is the burlap bag," says A. R. Baggett, prosperous truck-farmer of Suffolk, Virginia. "There's no wasted, spilled fertilizer with strong-seamed burlap bags that stand up to rough handling. They stow better and take less men for loading and unloading. I've been a burlap man for 35 years—was, have been, and always will be."

*Time-saver, money-saver*—no wonder burlap is the farmer's favorite bag. Suppliers who are trying to serve the farmers' best interests pack fertilizer in burlap bags. Fertilizer keeps better in ventilated burlap bags and handles easier in the tough, heavy-duty burlap. You can save your own time and money by packing in the good old standby—burlap.

**Just ask your own customers—  
they'll tell you that burlap**



**Is strong**—takes dragging, dropping, man-handling—any tough job on the farm.



**Gives good ventilation**—keeps farm supplies and products fresh.



**Laughs at sudden showers**—wetness or dampness can't weaken it.



**Saves money**—extra value from re-sale and re-use.



**Saves storage space**—stacks to any height without slipping.



**Has 1000 uses**—always in demand on the farm (popular with farm wives, too!)

**THE BURLAP COUNCIL**

of the Indian Jute Mills Association  
155 East 44th Street, New York 17, N. Y.

Dr. Charles W. Nelson's motivation study report and an eight member panel discussion group led by V-C's Curtis A. Cox head a top-flight NSC Chicago

## Fertilizer Safety Program

A FINE program has been arranged by the Fertilizer Safety Section, National Safety Council for its meetings at the 43rd Annual Safety Congress in Chicago, October 17-21. J. Lauren Shopen, chairman of public relations for the group says it will be the "most outstanding" yet held by the section.

Two afternoon sessions, on the 17th and 18th, are scheduled for the section and will be held in the

Century Room of the LaSalle Hotel. General Chairman Tom Clarke is scheduled to address the section during the initial meeting followed by a nominating committee report and election of 1955-56 officers.

On the second day a luncheon precedes a well rounded panel discussion led by Curtis Cox. At the luncheon, B. J. Phillips will speak on the subject, "Is Safety First?" ▲

### Fertilizer Section NSC Program

#### Monday Afternoon, Oct. 17

- 2:00 Report of the General Chairman, Thomas J. Clark, G.L.F. Soil Building Service
- 2:20 Report of the Nominating Committee and election of officers. Vernon S. Gornto, Smith-Douglass co.
- 2:30 "Safety and Human Relations," Max W. Foresman, Spencer Chem. co.
- 3:00 "Selling Safety," P. W. Logan, Liberty Mutual Insurance co.
- 3:45 Report on Motivation Study, Dr. Charles W. Nelson, Univ. of Chicago
- 4:15 "Views and Interviews." Leader: Curtis A. Cox, Virginia-Carolina Chemical corp.

#### Tuesday Afternoon, Oct. 18

- 12:00 Luncheon
- 12:45 Remarks by the general chairman elect
- 1:00 "Is Safety First?" B. J. Phillips, Coronet Phosphate co.
- 2:00 "Safety 'Musts' " Panel Discussion. Leader: Curtis A. Cox, Virginia-Carolina Chemical corp.  
Mechanical Guards (display), Duncan MacDonald, Anaconda Copper Mining co.  
Conveying Devices, R. G. Diserens, Phillips Chemical co.  
Fire Protection, Fred H. Courtenay, Federal Chemical co.  
Liquid Nitrogen, C. L. McDaniel, Lion Oil co.  
Fertilizer-Insecticide Mixing Problems, R. P. Henry, Willson Products, Inc.  
Safety Rules, Albert A. Waugh, International Minerals & Chemical corp.  
Electrical Hazards, D. Lydy, Goodrich Gulf Chemicals, Inc.
- 3:45 Question and Answer Period (Panel Members Participating)

## Chemicals

### 350—Sohio Nitrogen

This fall, Sohio Chemical's nitrogen plant at Lima, Ohio, begins production of nitrogen materials. The company will store most of its output until the first of 1956 when shipments against contracts will begin. Included in the Sohio line will be anhydrous ammonia, aqueous ammonia, nitrogen solutions, urea, urea solutions and nitric acid. A fleet of new tank cars, tank trucks and van drays is ready to serve your needs. For complete product listing and price quotations

CIRCLE 350 ON SERVICE CARD

### 351—Versen-OL

Your special plant food mixes can be improved with the addition of Versen-OL iron chelate from Dow Chemical. Response of citrus and other horticultural crops to iron chelates is well known and Versen-OL is the first such product developed for all soils regardless of pH. Both this and its companion, Versene Iron Chelate, which is especially effective for acid loving plants and acid soils of the South, are absorbed on vermiculite for premixing with fertilizers. No special handling precautions are involved. For more information and bulk prices

CIRCLE 351 ON SERVICE CARD

### 352—Cyanogas G

With fumigation of stored grain of ever increasing importance it will pay to investigate the use of Cyanogas G from American Cyanamid. The material is economical to use, very effective and is easily applied. Up to 30,000 bushels per hour can be fumigated at an average cost as low as  $\frac{1}{4}$  cent per bushel and, when used at recommended dosages, insect kills approach 100 per cent. Even insect eggs laid in grain berries are killed.

CIRCLE 352 ON SERVICE CARD

### 353-56—Crag Fly Repellent

Dairyman in your area can boost production and profit with formulations incorporating Crag fly repellent. This product of Carbide & Carbon Chemicals is safe to use, repels all biting flies attacking cattle, improves the performance of pyrethrins, allethrin and methoxychlor and offers many other advantages. If you are interested in producing formulations with Crag fly repellent for use on dairy cattle, technical information is available on the following subjects:

- 353—Back Rubber Concentrates
- 354—Pressurized Sprays
- 355—Emulsifiable Concentrates
- 356—Oil Sprays

CIRCLE 353-56 ON SERVICE CARD

FREE INFORMATION to help you  
solve fertilizer, pesticide problems

## Reader Service

### 357—Triton Emulsifiers

Only two emulsifiers, Triton X-151 and X-171, are needed to prepare nearly any type of emulsifiable concentrate, according to Rohm & Haas. In addition to the obvious advantages of simplified operations and inventory, the two products are low cost and produce emulsifiable concentrates with better clarity and improved spontaneity. Storage stability is outstanding because the non-ionic portion of the twins is based on breakdown-resistant ethers. For more information, formulators only can

CIRCLE 357 ON SERVICE CARD

### 360—Piperonyl Butoxide

Fairfield Chemical points out some of the important attributes of piperonyl butoxide synergist—its definite insecticidal properties; a 10 fold increase in effectiveness of pyrethrum when this pesticide is combined with p.b.; and the fact that it is nontoxic to warm blooded animals. It stabilizes pyrethrum in two ways—reducing deterioration by screening out ultra-violet light and acting as an acid acceptor to retard decomposition and polymerization of pyrethrum. For complete technical data, typical formulations and sample label statements

CIRCLE 360 ON SERVICE CARD

### How to use the READER SERVICE CARD

- Circle number of literature you want.
- Print or type your name, position, company and address.
- Clip and mail the Service Card.

### 361—Igepon Line

Wettable powders offering faster wetting, stable dispersion and controlled foaming can be obtained with the Igepon line, according to Antara Chemicals. These additives can be used with a wide variety of herbicides and insecticides in either hard or soft water. Igepon T-77, and -73 and AP-78 are recommended for formulation of dry mixtures of wettable biocidal powders because they can be ground in without objectionable caking. For a new brochure on the complete line

CIRCLE 361 ON SERVICE CARD

### 358—DB Granular

Pacific Coast Borax has fortified 2,4-D with borates to produce DB granular, a new weed killer for deep rooted perennials. The material can be applied dry, and activity is extended because soil micro-organisms which normally cause early breakdown of 2,4-D are controlled by the borates. Seasonal rains place DB in the soil solution for effective killing action on the roots. For a descriptive service bulletin

CIRCLE 358 ON SERVICE CARD

### 362—Sulfoxide

For an aerosol formulation highly effective against roaches and flies and one that is safe to use in the kitchen, S. B. Penick suggests that you consider new improved Sulfoxide. A big advantage offered by this synergist for pyrethrum is the lack of nasal irritation. For more information

CIRCLE 362 ON SERVICE CARD

### 359—Monsanto Penta

Monsanto's newly revised technical bulletin containing full information on Penta wood preservative is now available. Included is an up-to-date list of literature references, improved safe-handling information and the latest classification changes in packaging specification and shipping. For a copy

CIRCLE 359 ON SERVICE CARD

### 363—Agrimul Booklet

Nopco Chemical has available an Agrimul emulsifier booklet providing tested formulae for nearly all solvent-toxicant combinations. The company's 4-point service includes top grade emulsifiers, new emulsifiers to meet your needs, expert advice on formulation and prompt service. For a copy of the booklet, formulators can

CIRCLE 363 ON SERVICE CARD



### 364—Prentox Information

Prentiss Drug & Chemical has issued a new Prentox information bulletin containing a suggested label outline for Prentox Pyronyl dust concentrate in combination with rotenone and fungicides. For a copy

CIRCLE 364 ON SERVICE CARD

### 365—Caustic Potash

Manufacture and uses of caustic potash are described in a brochure from Columbia-Southern Chemical. Well illustrated, it includes detailed procedures for unloading, precautions for handling, complete technical data including specific gravity and density tables of solutions and temperature and alkali conversion tables.

CIRCLE 365 ON SERVICE CARD

## Process Equip.

### 366—Reversible Impactor

Lowest possible cost-per-ton production of top quality materials is offered by the Williams Reversible Impactor. The unit turns out products from 2" to 35 mesh with a minimum of fines and a much finer product can be obtained with friable material. In closed circuit with external vibrating screens, one unit promises 100 per cent product sizing. The impactor features low maintenance costs. For literature

CIRCLE 366 ON SERVICE CARD

### 367—Baughman Mixer

Baughman Manufacturing is producing a Hi-Speed batch or continuous mix blender for feed or fertilizer production. A three hopper unit, the blender is equipped with a screw conveyor for uniform mixing and delivers about one ton per minute. For a bulletin on this low-cost blender

CIRCLE 367 ON SERVICE CARD

### 368—L-B Book

Many fertilizer producers have benefitted from Link-Belt equipment and engineering methods—regardless of the scope of their needs. L-B experience covers all phases of plant food production including dry-mix, superphosphate, nitrophosphate and other processes. For a book describing its services

CIRCLE 368 ON SERVICE CARD

### 369—Ribbon Mixers

Spiral ribbon mixers by Reed Standard are described in a new illustrated catalog. Included is information on units with from 1 to 500 cu. ft. capacity for continuous or batch mixing and blending of pulverized or granular materials, double-arm mixers and other items in the Readco line. For a copy

CIRCLE 369 ON SERVICE CARD

## Materials Handling

### 370—Hough HU

The Hough HU Payloader offers powerful pryout force through the use of break-out pads as a fulcrum for leverage. Load forces opposing the action are thus transferred to the ground instead of to the axle, wheels and hydraulic system. The 1 cu. yd. unit has top horsepower per bucket capacity, operates easily and is equipped with a powerful transmission. For more information

CIRCLE 370 ON SERVICE CARD

### 371—S/A Loader

Materials can be loaded and trimmed in box cars faster and cheaper with the S/A box car unloader, says Stephens-Adamson Mfg. Up to 150 tons per hour of granular product can be loaded and trimmed by one man working part-time. Prices run as low as \$762 f.o.b. Aurora, Ill. For complete data

CIRCLE 371 ON SERVICE CARD

### 372—Clamshell Catalog

A new Blaw-Knox catalog on 2, 3 and 4 line clamshell buckets has been issued which includes classified tables of some 60 sizes containing weight, dimensional and capacity data. Line drawings and photographs illustrate different styles of equalizers for attachment of holding lines.

CIRCLE 372 ON SERVICE CARD

### 373—Sauermaier News

A new scraper storage installation at Davison's Bartow plant is one of the features in the latest SAUERMAIER NEWS. Issued periodically, the digest type magazine contains articles on various materials handling operations involving Sauermaier equipment. For a copy

CIRCLE 373 ON SERVICE CARD

### 374—Magcoa Folder

Solutions to a number of difficult dock loading and yard loading problems are outlined in a new Magcoa folder. Line drawings illustrate common problems encountered when loading railroad cars and motor trucks. For a copy

CIRCLE 374 ON SERVICE CARD

### 375—Rubber Hose

A new eight page catalog digest contains specifications and descriptions of 68 Thermoid rubber hose types for industrial and agricultural use. In addition there is data on the firm's conveyor belts, transmission belting, V-belts and other materials.

CIRCLE 375 ON SERVICE CARD

## Packaging

### 376—GP&F Containers

Illustrations and complete information on the complete line of GP&F steel shipping containers are included in a new brochure. There are also descriptions and illustrations of various types of pouring spouts and data on lithographing facilities for utilization of your own advertising message. For a copy

CIRCLE 376 ON SERVICE CARD

### 377—FFFP Bag Scale

Grain, crumbles, pellets, range cubes, granulated feed and other mill products are handled manually or automatically by the Richardson FFFP bagging scale in weighings of 100, 50 and 25 lbs. For a data sheet describing new features and operation of the unit

CIRCLE 377 ON SERVICE CARD

## Miscellaneous

### 378—Fire Proof Buildings

Butler Manufacturing points out that its line of steel buildings are fire-proof, shielding contents from exterior fires and completely containing interior blazes. The units are half-finished at the factory for bolt assembly in half the usual erection time. For more information on construction features

CIRCLE 378 ON SERVICE CARD

### 379—Machine Accounting

A new Remington Rand folder relates how integrated ledger forms, ledger indexing systems and functional ledger tray designs provide smoother work flow with economies in time and personnel. Information on ledger equipment designed for greater work output is also featured. For a copy

CIRCLE 379 ON SERVICE CARD

### 380—Soil Measurements

Simple and reliable methods of measuring soil moisture content and salt or fertilizer content are described in new literature from Industrial Instruments. Theory and actual procedure methods are described in detail and in addition a complete listing of indicators, soil blocks and automatic irrigation control equipment is catalogued. For a copy

CIRCLE 380 ON SERVICE CARD

See pages 52 and 53 for information on these Reader Service numbers—

381—Michigan 75A

382—Duplicator Card Detector

383—L-N Takeup

384—Rietz Disintegrator

385—Teflon Tubing

386—Andrews Storage

387—LaMotte Scale

388—Roto-Bin-Dicator

389—Baughman SF-5



## Public education a 'bargain'

# NAC Views Positive Action

### W. W. Allen calls for progressive PR operations, industry statistics

**P**OSITIVE action by the pesticide industry was called for by W. W. Allen, president of the National Agricultural Chemicals Association, at its 22nd annual meeting held September 7-9 at Spring Lake, N. J. "As an association," said Allen, "we have been on the defensive for too long."

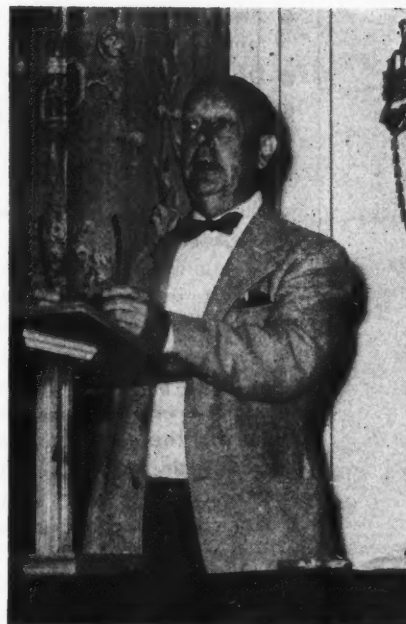
The manager of agricultural chemicals sales for Dow Chemical company also estimated that the rapid population increase and accompanying rise in food needs may well result in a 100 per cent increase in chemical usage during the next 20 years.

Of the other major addresses presented during the two day meet, that of Warren Moyer, president of Chipman Chemical company was one of the most interesting. Because of his excellent treatment of trends and problems in the pesticide industry, we are including Moyer's remarks as a separate feature in this issue (see page 46).

Continuing his discussion of offensive rather than defensive operations in industry public relations, Allen pointed out that although public education is expensive, it is a bargain when compared to the costs of lawsuits, adverse legislation and the "general frustration and lost motion of spending most of our time defending ourselves."

He again called for collection of complete industry statistics, vital information needed to avoid overproduction and low profit margins. "The simple solution," he said, "is to supply the association with a wealth of collective information on potential markets, and share it." When forecasts are made without enough data and when companies live in secrecy, he pointed out, the size of a market is invariably overestimated. Because of this, manufacturing and selling costs are usually underestimated.

Specific figures described by Allen include overall data of production capacity, periodical production



Lea S. Hitchner, NAC executive secretary, addresses the group as moderator of the Miller Bill discussion.

and sales figures and reports of inventory for any segment of the industry with more than three producers.

### Customer Safety Program

A. W. Mohr, president of California Spray Chemical corporation and a retiring director of NAC, pointed out that although the industry is doing a "splendid" job of educating its employees in the field of safety, its customer education program is not so strong or as well organized as desired.

A program based on the theme of Safe Practices was recommended by the Calspray head, one that would have a beneficial effect on business without unduly emphasizing the dangers or hazards of toxic

materials. Such a program would involve two distinct parts, one for industry and the other for the association.

For industry, he suggested that all media for public consumption such as pamphlets, sales literature, advertisements, etc. include a paragraph or statement on safety and, in the case of space limitations, a stuffer should be included. These points, said Mohr, should be stressed:

- Read the label.
- Observe and follow all directions and cautions on the label.
- Store pesticides away from children, animals and irresponsible people.
- Always keep chemicals in original labeled containers.
- Dispose of empty containers safely.
- If present labels do not have a statement on safe storage and container disposal, include such warnings in future printings.

Four activities were suggested by Mohr for the NAC association:

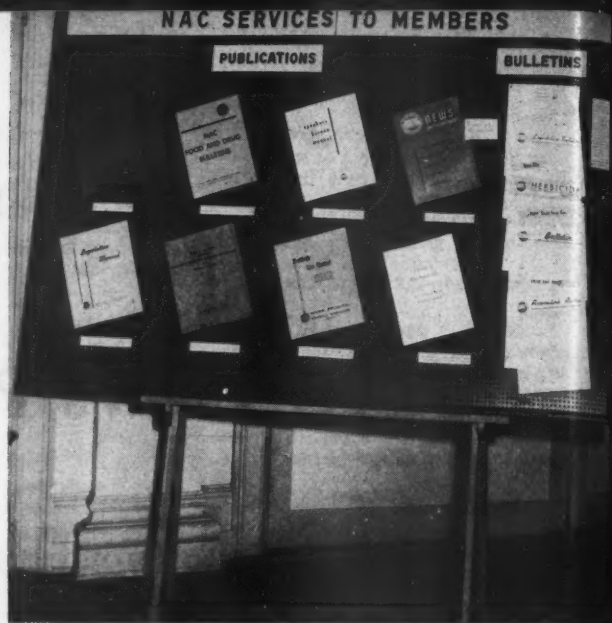
1. Urge universities, extension services and farm advisors to include statements on safety practices in all literature and recommendations covering the points reviewed above for industry; urge them to stress safety practices at growers meetings.
2. Prepare periodic press releases on safe practices, submitting these to all farm publications.
3. Work with National Safety Council for ideas and methods of better safety instruction.
4. Urge complete participation by NAC membership in the program.

A great deal would be accomplished by such a program, he concluded, if people are taught to read the label and to observe the directions and cautions. Combined with the teaching of safe storage and proper container disposal, it should "substantially" reduce the accident rate.

### The Economic Outlook

Each boom creates its own maladjustments which in the end lead to its termination, said Dr. H. E. Luedicke, editor of the *JOURNAL OF COMMERCE*, who took a look into the economic future for NAC members. Although a repetition of the early 30's is very unlikely, he commented, all future threats to the economy have not been eliminated and periodic readjustments are actually needed. Attempts to prevent these by application of artificial stimuli only make the day of reckoning all the more painful.

Two major vulnerabilities are involved in the current boom, he continued, and the first, a rapid rise in private indebtedness, has received the most publicity and consequently some corrective action.



This display board shows some of the publications and bulletins which NAC issues as part of its services to association members.

The other, a progressive cost squeeze against smaller and smaller business enterprises, said Luedicke, is not receiving warranted attention and is the most dangerous of the two. While record profits are produced by most large corporations, smaller concerns are being progressively squeezed between rising costs and increased competition—a difficult position in which to raise prices, despite the high level of consumer spending.

Luedicke commented that if the recent rate of increase in private indebtedness had been permitted to continue unhampered, the current boom would probably have bogged down under its own weight in a matter of months. "Only time can tell," he added, "whether the shift to a restrictive credit policy can accomplish what it is supposed to do, namely to slow down the boom without knocking it flat on its face." If this danger should arrive, he said, there is little doubt that again a period of credit restraint would prove quite short-lived.

There are only two solutions to the long range factor of the squeeze according to Luedicke and one, price inflation, is impossible under current conditions.

A slowdown in wage boosts is the other solution for, under current conditions, the present round of increases tends only to complicate matters for marginal businesses not in a sufficiently strong position to push modernization of equipment to better their competitive position. Normally, the increases would mean higher prices, for the wage gains were probably larger than those in productivity this year.

Wage policy is, of course, continued Luedicke, tied to the purchasing power theory championed by labor unions who base their strategy "on the unproven theory that uninterrupted increases in con-

sumer purchasing power are the best and only way to keep a boom rolling."

What are some of the steps that can be taken by management to maintain and improve their position? Luedicke suggests these:

- Greatest vigilance in keeping costs down wherever possible.
- Application of sensible pricing policies. Cooperative market analysis among smaller businesses offers some possibilities for avoiding "feast or famine" patterns.
- Closer attention to distribution problems.
- Keep up with new products development but avoid costly distribution experiments such as trying new markets where the opportunity of getting a toehold is too small in relation to financial risk.

These efforts plus a reasonable attitude on the part of labor could gradually eliminate the major vulnerability but, said Luedicke, such cooperation does not seem possible at present.

### Govt. Research & Industry

Discussing ways in which government research aids the industry, Dr. Samuel W. Simmons, scientist director, Communicable Disease Center, Public Health Service, USDHEW, Atlanta, Ga., pointed to the development of new products for manufacture such as allethrin and DDVP. Equally important however, noted Simmons, is the development of new formulations and techniques for the use of materials with known pesticidal properties.

A new formulation showing commercial promise but not yet in the manufacturing stage, he said, is one using cottonseed or soybean oil to improve effectiveness of DDT-dilan emulsions against resistant houseflies. This has already been prepared and

distributed for fly and roach control to the constituent plants of at least one large national concern.

Others include the addition of dimethyl carbonyl to DDT at 1 to 5 or 10 parts, effective as a space spray against DDT-resistant houseflies, and also the addition of sugar to increase residual effectiveness of organophosphate compounds against houseflies.

In their search for new means of pest control, he continued, government scientists are constantly finding new uses for existing commercial pesticides—using parathion and diazinon impregnated cords suspended in mess halls, dairies or rural premises for fly control; application of dieldrin, endrin and diazinon to protect animal carcasses from fly infestation for up to 26 days; and residual treatment with some chlorinated hydrocarbons for mosquito control.

The industry, said Simmons, is protected through research to establish criteria for safe use of pesticides. Although regulatory restrictions may at times work temporary hardships or postpone sale and distribution of products, monetary loss in such cases is probably less than that which would occur from premature distribution of unsafe materials. Research, he added, also prevents unnecessary restrictions.

Commenting on the extreme views on pesticide usage held by some factions, Simmons stated, "I am sure that the result of government research on toxicology of pesticides has done much to neutralize the efforts of those few who have used every fragment of information available to condemn modern pesticides."

He reported briefly on an epidemiological study of 83 farm laborers and a survey of 639 unselected persons on a large Mississippi cotton plantation where insecticides were used in quantity, sometimes even promiscuously. No effect of the chemicals on

Arthur W. Mohr, retiring NAC director; W. W. Allen, president; and F. W. Hatch, vice president.





the persons studied was noted except for cases of poisoning due only to carelessness. "No evidence was found," said Simmons, "that pesticides were the cause of any chronic disease or a contributing factor to diseases of other etiology."

The safety record of modern pesticides is good, he stated, although there are too many confirmed cases of poisoning and death from the use of pesticides in spite of elaborate precautions. Research by both parties must continue to provide adequate information on characteristics of the compounds before they are released for sale, and there must be a continuing study of them under practical conditions before they are on the market.

"We can ill afford to delay an increase in investigations of the toxicology of economic poisons," Simmons continued, pointing to the restrictions that could result from premature release of a pesticide with subsequent illness or death involving a large number of people. Such an event, he said, could hamper industry operations for 25 years.

### **Big Future for Systemics**

Systemic pesticides, according to Dr. J. T. Thurston, director, Stamford Research Laboratories, American Cyanamid company, will be the pesticides of the future. Speaking on the outlook of industry research, he added that "if one wishes to let his imagination wander, the farm practice of the future could conceivably develop to the point where planting and application of all necessary chemicals to provide nutrients and protection from pests for the entire season could be carried out in one operation."

Of recent development, he said, is the increased realization of the scope of losses in agricultural commodities after harvest. New chemicals for residual insect control in grain and experiments on the use of antibiotics for preservation of meat and vegetables indicate good progress in this field.

In meat production, heavy losses due to parasites and other animal pests are still a major factor, although considerable progress has been made. Evidence of expected gains includes the development of effective pesticides with low animal toxicity, the discovery of more selective therapeutic agents and the search for systemic type pesticides.

Control of forest pests is also gaining in interest, and it can be expected, said Thurston, that research effort will develop compounds for more specific applications in this field.

### **Hitchner, Hopkins, Lehker**

In his report to the NAC membership, Lea S. Hitchner, executive secretary, emphasized the importance of a positive program as suggested by W. W. Allen and stressed the need for constant repetition of the fact that "the proper use of pesti-

cides and pesticide residues do not now and have not in the past constituted a public health hazard."

During the coming fiscal year, said Hitchner, NAC hopes to submit some concrete suggestions for a program on the safe use of pesticides.

The services of NAC to its associate members, formulators or processors of pesticides, were reviewed by a new director of the association, James D. Hopkins, president of Hopkins Agricultural Chemical company.

Hopkins pointed to a number of important services rendered by the association, stating that every formulator should be an associate member if his activities include the selling of pesticides under his own label or if his gross business runs around \$250,000 annually. He suggested that concerted action by present associates be taken to gain additional members from this segment of the industry.

Glen E. Lehker, Purdue extension entomologist provided an entertaining break in the program with his well known chalk talk on insects and their control.

Members of NAC's Miller Bill panel included Winton B. Rankin of FDA; USDA's J. T. Coyne; Dr. Charles Palm, Cornell University; and NAC counsel, John Conner.

### **Increase in Petition Fees**

Rankin, assistant to the FDA commissioner, reported that an increase will be necessary in fees charged for filing and processing of pesticide petitions. He pointed out that the original fee schedule was developed with no background of experience, representing the best guess of informed persons. As of July 21, FDA had not collected as much in fees as was required during the previous year to enforce the Miller Bill.

It is expected, he said, that about 30 petitions for tolerances and exemptions will be submitted during the six months ending January 21, 1956, and past experience indicates that processing will cost about twice as much as will be collected on the present fee schedule. Rankin emphasized that the Miller Bill requires the DHEW to establish a self supporting fee structure.

Although defoliant is not economic poisons under the Federal Fungicide, Insecticide and Rodenticide Act and thus tolerances can not be established under the Miller Bill, Rankin said that if residues are present from the use of such materials, tolerances should be established under the Federal Food, Drug and Cosmetic Act under public hearing procedures.

In clarifying the public hearing set-up, he pointed out that delays occurring after the 1950 series resulted from the effort to handle too many chemicals at one time. About 80 chemicals were considering during 82 days of hearings.



FDA plans to limit the scope of future hearings, he added, to avoid such an occurrence and believes that the hearing can be held in a matter of days with a final order issued in essentially the same period of time required to process a petition under the Miller Bill.

Rankin suggested that producers of defoliants, fruit-set hormones or other chemicals not subject to the Miller Bill file a request with the FDA for a public hearing.

In answer to queries from the floor, he stated that safe tolerances should be established on meat and that a meeting with the American Meat Institute was held to discuss the problem. Regarding pesticides in milk, he pointed out that this problem relates directly to tolerances on forage and that these should be set so that residues do not appear in the milk of dairy cattle fed on the forage. Poisonous chemicals should not appear in milk, he added, for it is in a distinct food category principally because of its use by babies and aged people.

#### **USDA & the Miller Bill**

J. T. Coyne, assistant head of the Pesticide Regulation Section, Plant Pest Control Branch, ARS, USDA, substituting for Dr. W. G. Reed, head of the section, reviewed some of the problems encountered by his unit during the past year in its functions under the Miller Bill.

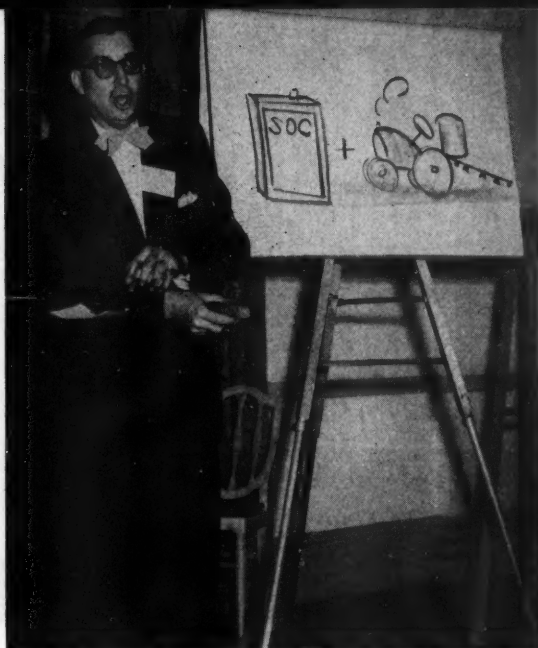
He noted that some petitions have been received, requesting certification for non-economic poison uses and pointed out that the section is unable to handle such requests because of statutory limitations. Generally, certification of usefulness hasn't been too difficult because most uses proposed have been included under some formulation of the chemical involved when it was registered under the Federal IFR Act.

More difficulty has occurred in expressing an opinion as to whether the tolerance or exemption proposed, reasonably reflects the residue likely to result from the proposed use. In many cases, said Coyne, residue data submitted has been inadequate and at times no data was submitted with respect to a particular crop.

Under such circumstances, in the absence of favorable data on another crop in the same family, a favorable opinion could not be expressed.

Extrapolation of data was another problem cited by Coyne and has resulted because in some petitions directions for use and the residue work have not been consistent in the application rates and the intervals between last application and harvest.

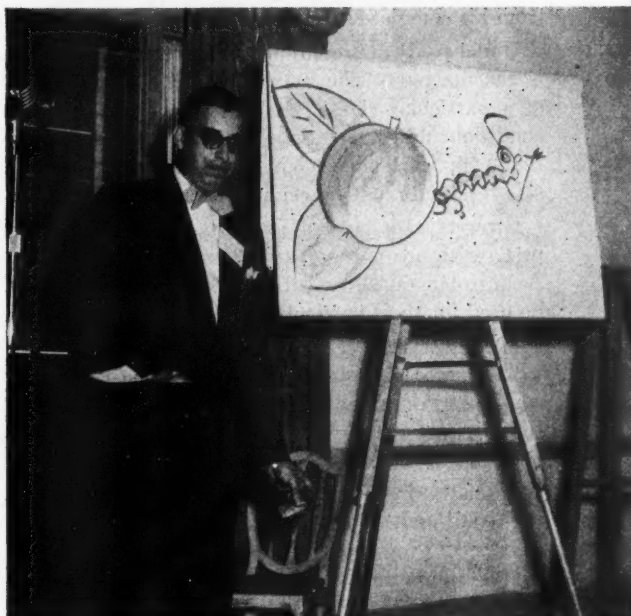
The final problem mentioned was a tendency for some petitioners to propose tolerances on the basis of comparative toxicology irrespective of differences in dosage, application schedules and the characteristics of the particular crops involved. Some feel



Can and tractor applicator illustrate a point in Glen Lehker's talk—that, with the advent of synthetic organic compounds (SOC) and improved application methods, control gained in effectiveness.

## **Lehker at Work**

Another of Lehker's drawings illustrates the ineffectiveness of pest control prior to newer developments.





Members of Miller Bill panel: Dr. Charles Palm, Cornell; Winton B. Rankin, FDA; Lea S. Hitchner, moderator; USDA's J. T. Coyne; and John Conner, NAC counsel.

that, based on tolerances previously announced for other chemicals, if analysis of their material indicates the same order of toxicity, the same tolerance should apply—even if unsupported by residue data.

An increase in petitions submitted during recent weeks was noted by Coyne as a sign that "some real inertia has been given to the move to bring all pesticide chemicals into compliance with the statute."

### Growers' Problems Considered

Dr. Charles Palm pointed out that 1956 recommendations from the land grant colleges can include only those pesticides for which tolerances have been established. Extension workers, he added, will need data on residues that the grower will have at harvest from his complete spray schedule.

Under study at present in addition to new schedules is the matter of one maximum level for chemicals of a particular class. Because of varying weather conditions and infestations the question of an additional application in such instances without exceeding safe residue limits is receiving attention.

Growers also have a problem, said Palm, when pest resistance is found to recommended chemicals. A control might be available for other uses but cannot be used for their particular crop because a tolerance is not established or registration granted.

"The whole problem of grower education is a continuing one," he added, "and under the Miller Bill, it assumes even greater significance than before."

Special attention is needed, according to Palm, on the continuance of cooperative experiments with interested growers. "It is unrealistic to urge a farmer to use only those pesticides that meet tolerance requirements on his crops," he continued, "yet turn around and ask him for an experimental area for using new materials experimentally, unless the investigator can provide assurance that no residue

will result or that he has an experimental tolerance which can be met."

Many experimenters feel, said Palm, that experimentation with new materials may of necessity be confined to experiment station plots which can be destroyed at harvest, limited to work on pesticides with established tolerances or conducted with an arrangement to purchase the crop from a cooperative grower if his crop is used.

The states can help industry by stepping up residue research programs, he commented, and can guide growers more effectively on seasonal programs. The pooling of information by all states within a region, he added, would be of benefit.

Growers, said Palm, are anxious to get an understanding of the Miller Bill for many recall the fruit and vegetable seizures in the past resulting from excesses of lead, etc. He stated that growers will not cut down on their chemical usage.

Palm also brought up the question of residue analysis during the production season and the possibility that commercial laboratories might step into the picture at this point.

### 1955-56 Officers, Spring Meeting

NAC officers were re-elected for another term—W. W. Allen, president, and Fred W. Hatch, manager, Agricultural Chemical division, Shell Chemical corporation, vice-president.

Three new directors were elected, James D. Hopkins, president, Hopkins Agricultural Chemical company; William J. Liipfert, senior partner, Woolfolk Chemical Works, Ltd.; and Loren P. Scoville, general manager, Chlorinated Products division, Diamond Alkali company. They replaced retiring directors A. W. Mohr, Russell B. Stoddard and T. L. Wilkerson.

It was announced that the spring meeting of NAC will be held in the Hollywood Beach Hotel, Hollywood Beach, Fla., on March 14-18, 1956. ▲

# Composition and Nitrification Characteristics of Some

## Sewage and Industrial Sludges— 1952

By K. G. Clark and V. L. Gaddy

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**M**ANY municipalities and industrial plants utilize rather expensive processing systems for the treatment of sewage (6) and industrial wastes as a means for preventing excessive contamination of streams and other natural water bodies. In most cases, the solid portions of the resulting sludges contain small, but appreciable amounts of nitrogen and phosphorus together with lesser amounts of potassium, calcium, magnesium and sulfur and other elements such as manganese, copper, boron and zinc of recognized importance in plant nutrition. Recovery of these waste materials or sludges in forms suitable for fertilizer use contributes to the over-all supply of plant nutrients available for agriculture and may in some instances defray in part the cost of waste disposal.

In recent years the introduction of individual garbage disposal units and increased use of synthetic detergents in homes are reported to have increased the difficulty of sewage disposal in some urban areas (8, 9). Owing to possible changes in the composition and properties of sewage sludges associated with the above developments it was considered desirable to examine currently produced typical sewage and industrial sludges in relation to their composition and nitrification characteristics. The present paper reports the results of such a survey of sludges collected from different types of disposal plants in 1952.

### Materials

Sewage products marketed for commercial fertilizer use commonly are classified as activated or digested sludges depending on whether aerobic or anaerobic processes, respectively, are utilized in decomposing the organic solids content of the raw sewage. The production of digested sludges in some cases involves preliminary aeration or short-period activation prior to initiation of anaerobic digestion whereas in others such preliminary treatment is not involved. Also in some instances activated sludge in excess of requirements is further decomposed by anaerobic digestion. The final stage of water removal from sludge cake intended for commercial fertilizer use generally is accomplished by heat drying to increase the probability that all pathogenic organisms have been destroyed and to improve the physical condition of the product.

A total of 18 sludges were included in this study. Of these five were activated sludges, four were digested sludges prepared with some degree of initial activation, six were digested sludges prepared without activation and three were industrial sludges representing wastes of the leather industry.

Table 1 presents data on the content of these sludges with reference to many of the elements of recognized importance in plant nutrition. It will be noted that the activated sludges tend to be somewhat more acidic than either the activated-digested or digested sludges and that the industrial sludges examined were neutral to basic in reaction.

The greater degree of decomposition of raw sewage accomplished by anaerobic in contrast to aerobic digestion is reflected by the relatively greater contents of acid-insoluble ash, or silica, and lower contents of nitrogen, phosphoric oxide and potassium oxide exhibited by activated-digested and digested

# Table 1 — Composition of Selected Se

Sludge		Reaction <sup>1</sup>	Moisture	Nitrogen (N) total	Phosphoric oxide (P <sub>2</sub> O <sub>5</sub> ) total	Potassium oxide (K <sub>2</sub> O) acid soluble	Calcium oxide (CaO) acid soluble	Magnesium oxide (MgO) acid soluble	Ferric oxide <sup>2</sup> (Fe <sub>2</sub> O <sub>3</sub> ) acid soluble	Sulfur (S) acid sol
Number	Source									
		pH	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
<b>Activated sludges</b>										
1	Chicago, Ill. <sup>7</sup>	5.3	3.93	5.60	6.97	0.56	2.22	1.03	7.41	1.14
2	Chicago, Ill. <sup>8</sup>	4.6	4.80	4.81	6.86	.30	1.63	.82	13.87	.76
3	Houston, Tex.	4.5	7.33	5.77	3.08	.30	1.26	.50	4.36	1.06
4	McKeesport, Penna.	5.5	4.69	5.68	7.38	.61	2.52	1.43	7.09	.98
5	Milwaukee, Wis. <sup>9</sup>	5.0	5.84	5.96	3.96	.41	1.64	.93	7.13	.95
<b>Activated digested sludges</b>										
6	Des Moines, Iowa <sup>10</sup>	7.0	4.67	1.81	3.31	.40	7.37	1.05	3.42	1.10
7	Hagerstown, Md. No. 1 <sup>11</sup>	5.9	13.57	3.13	2.81	.10	4.68	.86	2.34	.96
8	Hagerstown, Md. No. 2 <sup>11</sup>	6.5	4.79	4.71	4.96	.74	5.07	1.45	1.75	1.00
9	Los Angeles, Calif. <sup>12</sup>	6.1	4.55	2.49	4.07	.21	3.92	.78	6.04	1.00
<b>Digested sludges</b>										
10	Beltsville, Md. <sup>13</sup>	5.6	5.21	1.89	1.44	.19	2.22	1.01	3.37	1.17
11	Beltsville, Md. <sup>13</sup>	6.0	3.16	.97	.56	.18	.69	.44	2.18	.33
12	Greenbelt, Md. <sup>14</sup>	5.5	4.77	3.12	.91	.24	1.91	.28	1.53	.61
13	Indianapolis, Ind. <sup>15</sup>	7.2	4.01	1.71	4.32	.28	15.69	1.66	4.62	1.50
14	Rochester, N. Y. <sup>16</sup>	5.4	2.38	2.54	1.16	.29	2.14	.87	3.15	.91
15	Washington, D. C. <sup>17</sup>	6.0	3.68	2.06	1.44	.14	2.38	.60	4.44	.89
<b>Industrial sludges</b>										
16	Luray, Va. <sup>18</sup>	11.6	14.77	1.22	.42	.09	37.98	1.57	.40	.79
17	Mercersburg, Penna. <sup>19</sup>	7.2	11.35	2.64	.87	.17	12.96	1.24	1.33	.93
18	Williamsport, Md. <sup>20</sup>	7.6	18.76	1.45	.50	.18	18.87	.68	2.13	.58

sludges than by activated sludges. The apparent exception to this in the case of one of the Hagerstown, Md., samples arises from the fact that only Sample No. 1 represents the normal, activated-digested product (29.29 per cent acid-insoluble ash) recovered by filtration and drying whereas Sample No. 2 (15.14 per cent acid-insoluble ash) represents the unfiltered sludge suspension effluent from the digestors. The unfiltered suspension was evaporated and dried on a steam bath in the laboratory and except for changes in composition and volatilization losses resulting from this treatment represents not only the materials which would have been retained on the plant filters but also those which would have

appeared in the effluent therefrom. Since the sample of the effluent from the digestors was not separated into liquid and solid phase portions before evaporation and drying, a direct comparison cannot be made of the relative quantities of the various constituents delivered to the plant filters in solution and solid forms. The observed difference in acid-insoluble ash contents clearly indicates, however, that in this case an appreciable portion of the total solids from the digestors remained in solution in the effluent from the filters.

Inasmuch as the ratios of nonvolatile constituents to acid-insoluble ash contents of activated-digested and digested sludges tend to be less than the com-



# ed Sewage and Industrial Sludges

	Sulfur (S) acid soluble	Ash		Copper <sup>1</sup> (Cu)	Boron <sup>2</sup> (B)	Manganese <sup>3</sup> (Mn)	Molybdenum <sup>4</sup> (Mo)	Zinc <sup>5</sup> (Zn)	Sludge	
		Total <sup>6</sup>	Acid <sup>7</sup> insoluble						Source	Number
	Per cent	Per cent	Per cent	p.p.m.	p.p.m.	p.p.m.	p.p.m.	p.p.m.		
<b>Activated sludges</b>										
7.41	1.14	37.39	14.28	1,225	67	135	6.5	3,050	Chicago, Ill. <sup>7</sup>	1
3.87	.76	39.22	10.98	385	6	190	45.4	3,300	Chicago, Ill. <sup>8</sup>	2
4.34	1.06	30.18	16.58	1,035	8	65	6.7	950	Houston, Tex.	3
7.09	.98	37.93	14.46	1,500	74	150	6.0	3,650	McKeesport, Penna.	4
7.13	.95	27.73	9.90	435	8	130	13.5	1,550	Milwaukee, Wis. <sup>9</sup>	5
<b>Activated digested sludges</b>										
3.42	1.10	61.44	33.38	315	7	420	4.9	1,350	Des Moines, Iowa <sup>10</sup>	6
2.34	.96	47.06	29.29	490	7	70	3.7	3,050	Hagerstown, Md. No. 1 <sup>11</sup>	7
1.75	1.00	33.34	15.14	435	12	60	4.2	3,100	Hagerstown, Md. No. 2 <sup>11</sup>	8
6.04	1.00	49.11	25.90	1,440	15	265	12.0	3,700	Los Angeles, Calif. <sup>12</sup>	9
<b>Digested sludges</b>										
3.37	1.17	56.22	41.10	480	4	790	6.8	2,050	Beltsville, Md. <sup>13</sup>	10
2.18	.33	74.28	67.60	100	3	130	118.0	610	Beltsville, Md. <sup>13</sup>	11
1.53	.61	38.22	30.02	360	8	120	2.1	1,450	Greenbelt, Md. <sup>13</sup>	12
4.62	1.50	58.56	24.84	755	7	440	9.6	2,750	Indianapolis, Ind. <sup>14</sup>	13
3.15	.91	42.79	30.49	1,980	12	60	5.1	3,400	Rochester, N. Y. <sup>15</sup>	14
4.44	.89	52.83	37.43	435	8	140	5.4	2,200	Washington, D. C. <sup>16</sup>	15
<b>Industrial sludges</b>										
.40	.79	51.27	1.94	90	74	145	.4	75	Lurey, Va. <sup>16</sup>	16
1.33	.93	38.87	15.00	200	271	260	23.6	220	Mercersburg, Penna. <sup>16</sup>	17
2.13	.58	55.69	27.39	130	100	760	7.2	260	Williamsport, Md. <sup>16</sup>	18

<sup>1</sup> pH at 1 to 4 dilution.

<sup>2</sup> Potassium dichromate titration of acid extract using diphenylamine sulfonic acid as indicator.

<sup>3</sup> Dry ashed 1 hour at 800° C.

<sup>4</sup> A. O. A. C. Methods of Analysis 1955, Sec. 2.8.

<sup>5</sup> Colorimetric procedures: dithizone for

Cu and Zn, periodate for Mn and dithiol for Mo.

<sup>6</sup> B by the curcumin method (Ind. Eng. Chem. Anal. Ed. 11 (2):281, 1939).

<sup>7</sup> Calumet Works.

<sup>8</sup> West-Southwest Works.

<sup>9</sup> Secured from a retail outlet.

<sup>10</sup> Separate tank digestion, sand filtration.

<sup>11</sup> Residue recovered on drying the sludge suspension from the digestors.

<sup>12</sup> Imhoff tank, sand filtration.

<sup>13</sup> Separate tank digestion, glass-house enclosed sand filtration.

<sup>14</sup> Aeration followed by lagoon digestion.

<sup>15</sup> Separate tank digestion, vacuum filtration.

<sup>16</sup> Lagooned wastes from the leather industry.

parable ratios for activated sludges, it appears that anaerobic digestion in addition to promoting a greater degree of decomposition of the organic matter of raw sewage than aerobic digestion also tends to discharge a greater proportion of the non-

volatile components in the effluent water.

The industrial sludges were found to be low in nitrogen, phosphoric oxide and potassium oxide and relatively high in calcium and magnesium oxides in comparison to the sewage sludges.

**Table 2. Range of nitrogen and phosphoric oxide contents of sewage sludges prior to 1945<sup>1</sup>**

Sludge type	Total nitrogen (N)	Total phosphoric oxide (P <sub>2</sub> O <sub>5</sub> )
	Range Per cent	Range Per cent
Activated .....	3.2-8.0	2.0-6.7
Activated-digested ...	1.4-4.35	1.2-3.6
Digested .....	0.8-3.56	0.1-4.00

<sup>1</sup>Compiled from data collected by the Federation of Sewage Works Associations (6).

Table 2 shows the range of nitrogen and phosphoric oxide contents of the principal types of sewage sludges prior to 1945. A comparison of these values with those of Table 1 shows that the present sludges generally lie within the recognized ranges for nitrogen and phosphoric oxide, but with some possibility that the 1952 sludges may contain somewhat higher percentages of phosphoric oxide than earlier products. Somewhat higher values for zinc were observed in the present study than usually have been associated (6) with sewage products. Whether the possible increase in phosphoric oxide content and the observed higher zinc content are directly attributable to the trend toward increased use of individual garbage disposal units and phosphatic detergents in urban areas is conjectural.

### Quality of the Nitrogen in Sludges

Plant growth tests are the accepted final criteria for evaluation of the ability of a material to supply nutrients to growing crops. Determination of the available phosphoric oxide and potassium oxide contents of fertilizers and fertilizer materials may be made in the chemical laboratory by relatively straight-forward procedures (1). Laboratory procedures are prescribed also for determining the quality or activity of the nitrogen content of in-

soluble materials, but they have been shown to be inapplicable for proper evaluation of certain types and combinations of organic materials (3, 4, 7). Consequently the degree of conversion of the nitrogen in insoluble materials to the soluble and available nitrate form by bacterial action in soil media is recognized as a more reliable index of the quality of water-insoluble nitrogen than the presently available chemical procedures. Hence the evaluation of the quality of the nitrogen content of the sludges in the present study was limited to the determination of their nitrification characteristics.

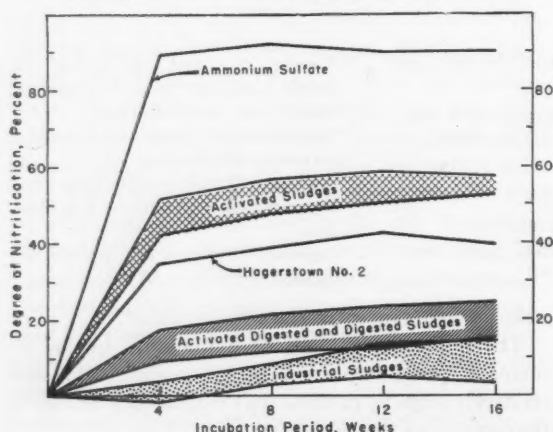
The following standardized procedure was used in determining the degree of nitrification after 4-, 8-, 12- and 16-week incubation periods. A 20-mg. nitrogen equivalent of a sample was mixed with 100 g. air-dried Morgnec silt loam soil in a 500-ml erlenmeyer flask and the leveled mixture overlain with an additional 10 g. of soil. Before use, the pH of the soil was adjusted to the range 6.9 to 7.1 by addition of calcium carbonate. The moisture content of the mixture was adjusted to the moisture equivalent of the soil (2), the flask lightly stoppered with a cotton plug and the mixture incubated at 30° C. for the desired period with weekly replacement of any water lost by evaporation. At the end of an incubation period, the nitrate content of the mixture was extracted and determined photometrically by the phenoldisulfonic acid procedure (5). The result was corrected for the nitrate found in a similarly incubated and extracted soil blank, and the corrected result was expressed in terms of the percentage of the nitrogen content of the sludge that had been converted to nitrate form.

Since organic materials necessarily undergo ammonification prior to nitrification, slow action in the ammonification stage is reflected in low nitrification values provided the potential nitrifying capacity of the soil medium is adequate. Companion ammonium sulfate-soil mixtures, therefore, were similarly incubated and extracted to provide an index of the adequacy of nitrifying capacity of the soil used, and for comparison of the nitrification characteristics of the materials under study with those of a soluble nitrogen source. It was not considered necessary to include companion mixtures containing a standard water-insoluble nitrogen as earlier experiments had demonstrated the adequacy of the ammonifying capacity of the soil.

The nitrification data presented in Table 3 are averages of triplicate incubations for each incubation period. The observed degree of nitrification of all sludge samples was very much less than that of ammonium sulfate for all incubation periods.

With the exception of Hagerstown, Md., sample No. 2, which as indicated earlier was not representative of filtered, activated-digested sludges, the nitrification patterns of the other 17 sludges fall into three distinct groups. This is illustrated in Figure 1 in

**Figure 1. Nitrification Characteristics of Sewage and Industrial Sludges in Soil Media at 30° C.**



which degree of nitrification is plotted against length of incubation period. The shaded areas represent the range of the observed degrees of nitrification for each of the sludge groups.

The nitrogen components of digested sludges represent the materials more resistant to decomposition in sewage treatment processes and as shown by the data and the figure they are also the most resistant to nitrification processes. The nitrification pattern of the Hagerstown sample No. 2 (unfiltered) is intermediate between the activated and digested sludge groups but more closely approaches that of the activated sludge. The nitrogen contents of the industrial sludges examined were more resistant to nitrification than any of the sewage products.

It will be noted both from the data and from the figure that in most instances only relatively small increases in the degree of nitrification of the sludges occurred after the four-week incubation period. This is taken as an indication of the extreme resistance of

the residual nitrogen components of the sludges to decomposition by ammonification and nitrification processes, and the relatively low efficiency of the sludges as nitrogen sources for crop growth in comparison to chemical nitrogen fertilizer materials.

In general, the activated sludges were approximately 60 per cent, the activated-digested and digested sludges 20 to 22 per cent, and the industrial sludges only 10 to 12 per cent as efficient in the production of nitrate nitrogen as ammonium sulfate during the 16-week incubation period.

## Summary

Analytical data are presented with reference to the nitrogen, phosphorus, potassium, calcium, magnesium, iron, sulfur, boron, copper, manganese, molybdenum, zinc and ash contents of 18 sewage and industrial sludges collected or produced in 1952. The overall composition of the sewage products appears to have been affected only slightly, if at all, by the recent trends toward increased use of household garbage disposal units and synthetic detergents in urban areas. The quality of the nitrogen content of the sludges for fertilizer use, as determined by nitrification procedures, was substantially lower in all cases than soluble chemical nitrogen, but was highest for the activated sludges and lowest for the industrial sludges.

## Acknowledgment

The authors are indebted to M. S. Anderson for supplying the samples and furnishing information concerning their source and method of preparation and to Dorothy H. Carroll, L. J. Clark, A. J. Engel, W. M. Hoffman, B. M. Olive and Catherine B. Scott for many of the analyses reported.

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**Table 3. Nitrification characteristics of selected sewage and industrial sludges**

Sludge		Total nitro- gen con- tent Per cent	Portion of the total nitro- gen converted to nitrate form during incubation at 30° C. in Morgnec soil media for			
			4 weeks Per cent	8 weeks Per cent	12 weeks Per cent	16 weeks Per cent
No.	Source					
Activated sludges						
1	Chicago, Ill....	5.60	48.8	54.8	57.1	57.4
2	Chicago, Ill....	4.81	42.1	47.7	50.7	52.8
3	Houston, Tex....	5.77	51.1	56.7	58.7	57.6
4	McKeesport, Pa...	5.68	51.7	54.4	57.8	56.0
5	Millwaukee, Wis...	5.96	49.9	53.8	57.0	54.8
Activated digested sludges						
6	Des Moines, Iowa.	1.81	16.9	19.2	21.2	21.9
7	Hagerstown, Md. (No. 1).....	3.13	17.8	20.3	23.5	20.5
8	Hagerstown, Md. (No. 2).....	4.71	34.5	38.3	42.4	39.6
9	Los Angeles, Calif.	2.49	14.0	17.8	20.8	20.9
Digested sludges						
10	Beltsville, Md....	1.89	17.5	21.5	22.1	22.4
11	Beltsville, Md....	.97	9.0	11.7	12.3	17.0
12	Greenbelt, Md....	3.12	9.5	14.3	20.4	18.9
13	Indianapolis, Ind..	1.71	15.4	14.7	16.2	15.1
14	Rochester, N. Y...	2.54	15.4	20.2	23.3	24.8
15	Washington, D. C.	2.06	14.2	18.5	18.4	19.0
Industrial sludges						
16	Luray, Va.....	1.22	-1.5	8.7	13.6	14.6
17	Mercersburg, Pa...	2.64	1.9	3.0	5.0	3.2
18	Williamsport, Md.	1.45	3.9	3.7	5.2	5.5
Ammonium sulfate.		20.5	89.3	92.0	90.0	90.3

# Its Problems and Needs, Future Growth and Development Major Trends in the Pesticide Industry

OUR beginnings in the pesticide industry were perhaps rather haphazard, and certainly great new horizons were opened when the broad group of new organic pesticides was gradually introduced following the second World War. These new products were the result of, but also provided great stimulus to research—which with its related technical service, is to me one of the most important developments in our field of activity. All this new range of products has presented many problems to our production and sales people, but certainly has pumped a lot of new blood through our veins and caused a growth that has made the industry anything but stagnant.

Apart from this significant development of research and technical service, it seems to me that two of the most important factors which have affected our industry are the introduction of a great many new companies into the business, some of them very large chemical manufacturers, while on the other hand, the nature of the products involved and their formulation and methods of use have resulted in development of a great many small companies, mixing and formulating basic chemicals produced by others and distributing those formulations. Certainly no one can deny the essentiality of the large chemical manufacturer with basic production facilities and large technical staff; at the same time I don't believe anyone can properly deny the place of the small mixer and formulator who serves at a local level. Between these two are all sizes, shapes and combinations. It is inevitable that with so many factors involved, many of them new, time is required for the proper integration of all these various participants to their most efficient functions and relationships.

## World-wide Activities

There is another important integration involving research, production and formulation extending beyond the borders of the United States and including

activities of our neighbors in Canada and Mexico; in South America; quite notably in England and Germany; and in many other parts of the world. The establishment of relationships and channels of information pertaining to our industry will certainly lead to a beneficial flow of ideas as well as materials in both directions between the United States and many other countries.

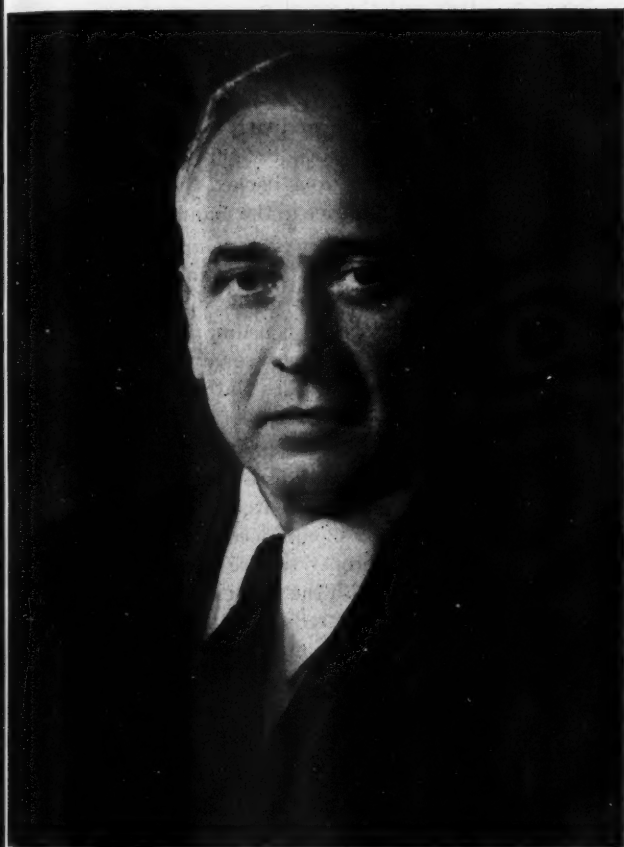
We in the United States have perhaps a particularly outstanding problem with the development of our highly mechanized agriculture. A measure of this development is brought out by the Bureau of Census figures indicating that currently 11 per cent of the population are employed in agriculture, whereas in 1914 there were 30 per cent of our workers employed on farms.

We know that throughout the world, more crops must be raised on limited useful acreage, in spite of the opening of new areas for more efficient farm production. We have seen a great deal of this in the United States with the opening of our great irrigated farmlands, but perhaps some of us do not fully realize the extent to which this same movement is proceeding throughout the world. For some reason I was particularly struck with the description of waterpower development in French North Africa which, in spite of its political troubles, is opening up 344,000 valuable acres to irrigation and farming potential.

Whether we are associated with these world-wide activities in the export and import of commodities or in the export and import of ideas, it is certainly of first importance that we should maintain world-wide contacts and channels within our industry. We all know that pesticides generally are used to a much lesser extent than economics justify and we have an ever present challenge to find ways of further developing the efficient use of our products for the



# Pesticide Industry



**By Warren Moyer, President**  
*Chipman Chemical company, inc.*  
*Bound Brook, N. J.*

**"If I were to make one single plea to this industry in the interest of its future healthy growth and development, it would be to concern ourselves more seriously with the management function as applied to our particular industry whether departmental or company-unit . . ."**

benefit of agriculture and for the development of our industry in a healthy manner.

The U. S. Tariff Commission figures indicate the consumption of organic chemicals in agriculture had gone down since 1951 from 150 to 118 million dollars.

Of course we all recognize the impact of varying seasonal conditions plus the effect of reduced unit prices; nevertheless, it did seem to me surprising. (No doubt the price of DDT was a considerable factor.) It would seem to me the trend should be much more strongly and uniformly in the other direction. Have we possibly taken too much for granted as to the desirability of pest control and failed to make as good a case as we might to prove the net practical economy to the individual farmer? He watches his pennies pretty carefully, even though he has to be a good gambler.

## **Government Relationships**

Our government is a very important partner in agriculture as we all know. The government currently has an investment of some seven *billion* dollars in agricultural products, and has extensive and highly-trained organizations to deal with practically all phases of agricultural problems.

Naturally the relations of our industry with interested government officials are many and complex. I am happy to say they seem to be good relations, constructive and valuable on all sides. I believe our industry can be proud of the fact it has carried its responsibilities well and has earned the confidence of government officials, as well as of agriculture generally. Among these prime respon-

## ... Major Trends in the Pesticide Industry

sibilities have been the maintenance of adequate production facilities and inventories of materials to insure against the farmer's ever being caught short of needed pest control chemicals.

During the war when many of our raw materials were in short supply, suggestions were advanced to the effect that the government could, more effectively than industry, maintain reserve inventories to protect the farmer, and could more efficiently direct production to centralized and highly efficient manufacturing plants, eliminating many smaller or less efficient units. Fortunately these suggestions were not seriously entertained, but they firmly impressed on my mind the great importance of our industry's protecting the farmers' requirements even at the cost of high inventories which we sometimes find burdensome to carry.

### The Inventory Problem

There are occasionally indications that some of the newer and particularly the larger companies in our industry are not fully aware of the attitude which must be taken toward this inventory problem and many policies are affected. Naturally, anyone accustomed to dealing with industrial chemicals or products having a fairly level flow of demand does not at first fully understand the fact that in this business, demand is created not only by demonstration that a product will perform its function, but also that demand is controlled by the question of whether or not the function is necessary at the moment.

In other words, you can't sell an insecticide to a farmer who doesn't have any insects to kill, and no amount of price reduction or sales effort will move the chemical to the farmer until he needs it. Then he needs it badly, and quickly. We must recognize the inventory problem as part of the basic nature of our business and not let it distort our policies.

This perhaps also relates to the oft-repeated whine we hear from suppliers, competitors and customers: "We are not getting our share of the business." What is his share of the business? And how does he determine it, except by desire and some arbitrary formula of his own making? To my way of thinking, no company deserves a share of the business except as they earn it by performing an efficient service, by developing the demand for that service and the products which they offer in connection with it and then recognizing that the "share" must be in proportion to the season's needs.

We are a small but highly specialized segment of the chemical industry; however, we are unique in

our need for intelligent and capable personnel in the field, both of a technical and commercial character.

We are also in some ways unique in that we have many facets of supervision and control by the government for the protection of the farmer and these government relations have particular impact on our research and technical services.

Our formulae and specifications of our products are almost entirely a matter of public information, so that we enjoy a minimum of benefit from establishment of reputation and from the nature of trademarks, labels and the usual quantities of proprietary products.

I believe there are very few cases in industry where the consumer and even the farmer as a semi-industrial consumer, buys products on technical specifications, detailed and officially approved rather than on proprietary descriptions backed by reputation, advertising and confidence in the manufacturer.

At the same time our industry is made up of many companies whose policies are established and whose management-thinking is trained in the direction of industrial sales and industrial consumption where merchandising and selling methods are very different than they are in the consumer sales and particularly sales to farmers.

An example of the kind of difficulty this leads to is apparent when many times we see basic chemical manufacturers selling technical materials opportunistically through channels ill-equipped with experience or staff to render proper service and without the costs of that service, with the result the technical material goes into a formulated product to be sold at a price with which the basic manufacturer himself can scarcely compete.

Actually it seems to me that with all the talk about evils of our competitors, we should all be careful to see we are not reaching out to cut our own throats while desperately trying to capture our competitors' established business. If we keep our eye in the direction of the development of business, based on service and efficiency, we will not have to seek the channel of endeavor which consists of simply trying to steal business which has been developed by others.

Some people seem to feel that the way to develop additional business is to buy it outright. One \$634,000,000 unit in the chemical industry has been developed as the result of sixteen acquisitions in the past five years. Another somewhat less ambitious, involving a mere \$224,000,000 unit, has been made up of fourteen acquisitions in that same five year period. I have no criticism of this trend toward merger and

acquisition; certainly great volume of production has led to great development in the chemical industry, and many of our developments would be impossible without huge financial structures to carry the burden of research, development, and the building of costly plant facilities large enough for a high degree of efficiency. This question of size is one which, to me, should be judged entirely on the merits of its performance.

It can be, of course, that the much-discussed question of intra-company costings work a hardship on the smaller or more independent manufacturer. I strongly believe it is only healthy that every chemical manufacturer, large or small, should scrutinize departmental and actual costs as straightforwardly and as honestly as possible. I have heard it said that some companies would carry agricultural chemicals at a loss with complete indifference because the volume isn't very large in proportion to their total volume and it is an important public relations factor in their overall picture. It does seem to me that such policies are unhealthy if they do exist and they must ultimately be revised.

I have also heard it said that one trouble with the pesticide industry is that everyone who is not in the room at the moment is a cutthroat and a pirate. I sometimes think we would all be a little better off if we would look in the mirror before blasting our competition too ruthlessly.

It certainly is clear this industry has a basic and vital job to do and each segment of it must ultimately stand or fall on the efficiency with which it does that job. This means we require good research, honest technical service, sound sales policy and realistic merchandising and general management policies. There is room for big companies and small ones, national companies and local ones, if

**"There is room for big companies and small ones, national companies and local ones, if they will wisely fit themselves into the picture and perform their functions efficiently without attempting to overreach and infringe upon activities they are not suited to perform."**

they will wisely fit themselves into the picture and perform their functions efficiently without attempting to overreach and infringe upon activities they are not suited to perform. We have suffered and I believe we still do suffer from rapid and ambitious growth of this industry in many respects, but we are growing up and perhaps will soon settle down somewhat more calmly.

After all, none of the terms we use in describing the "industry" mean very much except as collective generalities, because the industry, like each of our companies, is made up of individuals. The training and experience of these individuals will in the long run determine the course of our business activities and our degree of success or failure. Personnel can therefore well be our Number One industry problem and good men are hard to find—especially when we want specialized, technical training. I understand some pesticide manufacturers seek to provide incentive to their field men by bonuses or other means of evaluating individual performance—based solely on dollar volume of sales produced. Is this sound policy in this business? Do we not require a way of rewarding our men on a broader basis of service rendered, business constructively created and developed, and perhaps even with regard to profit produced—not mere sales volume? Our men are human and react in relation to the incentives offered them. Let's try to find ways to establish incentives for creative, constructive and profitable performance. Profit is not a nasty word—it must be made somehow, sometime, somewhere or we cannot provide our very essential service to agriculture. I think we all know that we have at times suffered from individuals in key positions in the industry who were not properly equipped for their particular responsibilities, no matter how well-trained they might be in other fields.

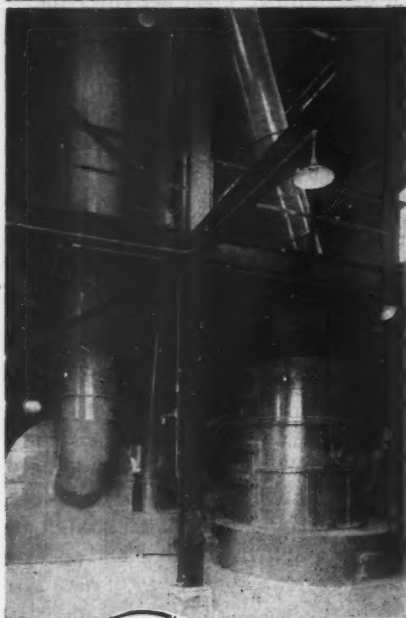
## **Management Needs**

Unfortunately, one of the most important areas of all business activity is in the field which is the most ill-defined as to qualifications and training. I refer to the ambiguous designation of "Management." A man may be a good chemist, a good salesman, a good entomologist and even possibly all three, and still be a poor manager.

If I were to make one single plea to this industry in the interest of its future healthy growth and development, it would be to concern ourselves more seriously with the Management function as applied to our particular industry whether departmental or company-unit, as I believe this is the segment where sound thinking, constructive policies and good, patient business judgement must be further developed to lead us to a higher plane and to the greatest individual and collective satisfaction of accomplishment. ▲



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# Chemicals

## Report on USDA

### Systemic Studies

Studies on a new systemic chemical, MOPA, (alpha methoxyphenylacetic acid) are reported by USDA scientists. Experiments have shown that MOPA applied to plant leaves or stem is absorbed and translocated both upward and downward inside the plant. With the help of soil moisture, the chemical can even move from the roots of a treated plant into those of an adjacent untreated plant in the soil. MOPA is a growth-regulating chemical, first compounded by Dr. Wilkins Reeve of the University of Maryland.

Dr. John W. Mitchell and his associates at the Plant Industry Station, Beltsville, believe that the great mobility of MOPA within plants is probably due to the chemical's molecular structure. They have found another substance chemically related to MOPA, mandelic acid, which also moves readily through plants, though not from the roots of one plant to another. Unlike MOPA, it has no visible growth-modifying effect.

Results obtained with mandelic acid seem to indicate that ability of a chemical to move inside plants can be independent of any ability to affect plant growth. Thus, it may be possible to develop systemics for varying purposes.

Another new approach to pesticide development involves adding certain substances to recognized plant-growth modifiers to increase their systemic action.

For example, the researchers have employed radioactive 2,4-D to trace its movement through a plant. They discovered that certain chemical additives, "cosolvents," boost the amount and rate of absorption and translocation of 2,4-D in the plant. The most effective cosolvent of several ma-

terials tested was an industrial detergent, Tween-20. It increased systemic action of 2,4-D in bean leaves about 800 per cent within 72 hours after treatment.

Use of radioactive 2,4-D has revealed also that plant leaves take up the largest amounts of the chemical when they are growing most vigorously. Furthermore, 2,4-D is most effectively translocated from the leaves to other plant parts when the leaves are in the intermediate stage of development or most vigorous stage of growth. Small, young leaves are gathering in nutrients for their own development, but do not pass much along to other plant parts, and mature leaves have slowed down their life processes.

## Monsanto Increases In Phosphate Prices

Effective Oct. 1, prices will be increased on certain phosphoric chemicals by Monsanto Chemical co. According to the company, the action results from accumulated increased costs in labor, raw materials and manufacturing. Chemicals affected include 75 per cent food grade phosphoric acid, sodium acid pyrophosphate, disodium phosphate, duohydrate, monoammonium and diammonium phosphate.

## New Miracle Mix Compost from Lilly

Miracle Mix, a new already-prepared compost, is being marketed by Chas H. Lilly co. in a range of container sizes from house-plant packages to bulk quantity sacks.

Lilly reports that in processing the product, materials are scientifically composted with a carbon to nitrogen ratio of not more than 20 to 1, and that sufficiently high temperatures are reached during manufacture to sterilize all ingredients, leaving the mix clean and with a pleasant odor.

## 3 FDA Petitions

Petitions have been filed with FDA by the following firms requesting establishment of residue tolerances:

DuPont co. EPN (o-ethyl-o-p-nitrophenyl benzene thiophosphonate) three ppm; Ferbam (ferric dimethyl dithiocarbamate), 0.1 ppm; Zineb (zinc ethylene bis-dithiocarbamate) 7 ppm; and Ziram (zinc dimethyl dithiocarbamate) 0.1 ppm.

Union Carbide & Carbon corp. Petition filed for extension of the tolerance for residues of glyodin (2-heptadecylglyoxalidine acetate) at 5 ppm on peaches.

Dow Chemical co. Tolerances of from 5 ppm (for apples, pears and quinces) to 200 ppm (for cottonseed) have been requested by the firm for residues resulting from fumigation with methyl bromide.

## Velsicol's Chlordane Merchandising Aids

Three new merchandising aids on household and garden insect control with Chlordane are available from Velsicol corp.

A four color mobile with true-to-life pictures of an ant, carpet beetle, chigger, clothes moth, sod webworm, spider, mosquito, roach and white grub, for store display; the 12-page Chlordane garden booklet; and the new 16-page Chlordane Household Insect Folder have been prepared.

## Borden Marketing N Garden Fertilizer

Borden co.'s Chemical div. now is marketing a 38-0-0 fertilizer said to be designed to last turf-grasses and ornamentals for an entire growing season with a single application.

Named Borden's 38, it is produced in the form of tiny white pellets, packaged in 50 pound bags. Next spring, it will also be marketed in smaller packages for home garden use.

## Equipment & Supplies

### RS-381 Michigan 75A Brake System

Four-wheel hydraulic brakes, previously available only on larger machines in the line, are now standard equipment on the Michigan Model 75A Tractor Shovel manufactured by the Construction Machinery div. of Clark Equipment co.

This model has a one cubic yard bucket capacity and weighs 12,750 pounds. With four-wheel

with complete details can be obtained by circling 382 on the Reader Service Card.

### New Pennsylvania Fertilizer Crusher

Pennsylvania Crusher div. reports it has developed a new crusher for the chemical and fertilizer industries adapted to the reduction of moist granulated and pelletized materials with a minimum of fines and oversize.

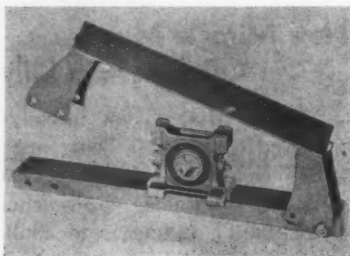
The firm says its crusher has the added advantages of minimum caking or plastering of material in the crusher, along with easy and quick accessibility for internal cleaning.

### RS-383 Re-Design Link-Belt Takeup

Significant design advancements have been incorporated in the DS takeup, according to Link-Belt co.

A new one-piece hinged top frame permits easy access to the bearing block and adjusting screw. The top swings upward after three bolts are removed from the base. A new arch-frame design adds strength to the end brackets.

The improved DS takeup is interchangeable with previous designs for use on a wide variety of



materials handling equipment such as apron, belt, chain, drag, flight and slat conveyors, providing a positive, yet easy means of adjustment.

For complete information, including dimensional charts, circle 383 on the Reader Service card.

### RS-384 New Rietz Angle Disintegrator

Tremendously high output in the mixing, blending or dispersion of slurries is achieved by a new, lower cost version of the Rietz Angle Disintegrator, reports Rietz Manufacturing co.

Design changes in the RP series of disintegrators have resulted in



a high degree of functional compactness. The angled motor mount and motor, directly coupled to the disintegrator head and rotor, serve as a self-contained base for the entire unit. Various sized disintegrator heads are available with 4", 6" or 8" diameter stainless steel rotors to operate on horsepowers of from 2 to 25.

Full information on the RP series is available by circling 384 on the Reader Service card.

### RS-385 Flexible Teflon Tubing

Developed for use in the chemical, petroleum, pharmaceutical and food industries, Pennsylvania Fluoroplastics co.'s new line of Teflon flexible tubing is inert chemically, allows no contamination in high purity streams and is unaffected by corrosive fluids and strong solvents.

With a service temperature range from that of liquid oxygen up to 500° F., the tubing is extruded in sizes from 1/8 to one inch inside diameter, and standard wall thickness is 30 mils through 5/8 inch inside diameter tubing.

For additional information, circle 385 on the Reader Service card.

drive and rear wheel steering, it is offered with either a 77 horsepower gasoline engine or an 80 horsepower diesel engine. A 12 volt electrical system facilitates quick starting in cold weather.

For additional data, circle 381 on the Reader Service card.

### RS-382 Duplicator Card Detector

The Remington Rand duplicate card detector simplifies and speeds up payroll, production control, accounts payable and receivable, balance forwarding, sales analysis and budget accounting operations, according to RR.

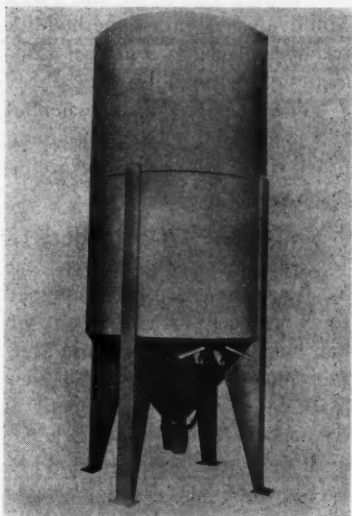
The detector separates single punched cards from groups of duplicate cards or segregates single cards and first cards of duplicate groups at 130 cards a minute. It can be set to sense and compare selected columns or over the entire 90 column punched card.

A copy of a new folder, "Duplicate Card Detector"

## RS-386 Andrews Bulk Storage

An all steel, bulk storage unit for fertilizer, feed, rock phosphate, cement, minerals and other free-flowing materials has been developed by Andrews Machine co.

Available in 10 or 25 ton capacities, the unit is fabricated in one unit of four legs, eliminating any assembly on delivery. The unit



has a hopper bottom with swing control gate and the bin is of 12 gauge steel with 16 gauge steel used for the top. An 18" manhole and cover for loading is located on top with a ladder leading down the inside for easy access into the bin.

For complete information, circle 386 on the Reader Service card.

## RS-387 LaMotte Liming Slide Rule

A Soil Reaction Slide Rule, recently developed by LaMotte Chemical Products co.'s Soil Research Laboratories, gives the recommended liming requirements for more than 600 plants, vegetables, grasses, trees, farm crops, etc., regardless of the type of soil in which they are grown.

The plant group slide is positioned opposite the soil acidity reading, and the amount of lime

required for the best growing condition is read directly from the scale. Alum requirements for alkaline soils also are given on the rule, which has separate scales for small areas and for farm operations.

For a free brochure on the slide rule, circle 387 on the Reader Service Card.

## Electronic Temperature Contact Controller

Operating on a current of less than one microampere, a new temperature-indicating, electronic contact-controller is said to automatically hold and control process temperatures as high as 2500°F. to within  $\pm 1$  per cent of scale. Valled the AIC Indicator/Controller, Model PB, it provides both straight cut-off and simple on-off control and is manufactured by the Automation Instrument corp.

The instrument consists of two separate units housed together in a single compact case 6" x 7 $\frac{3}{8}$ " x 5 $\frac{5}{8}$ ". A pyrometer unit indicates the temperature under control up to the control point, and an electronic control unit opens and closes the load relay regulating fuel supply to the controlled process. Capacity is 5 amperes at 115 volts.

## RS-388 Roto-Bin Level Indicator

Bin-Dicator co. has introduced a new Roto-Bin-Dicator, paddle-type bin level indicator, for special installations.

Particularly adaptable to installations in bins under pressure or vacuum; bins, chutes or conveyors handling materials containing large lumps which tend to bridge over a diaphragm; and bins handling materials which tend to "rat-hole" and prevent operation of a diaphragm, the Roto-Bin-Dicator has a slowly rotating paddle, mounted on a flexible shaft. This projects into the bin and is driven by a small

motor mounted in a housing outside the bin.

When material in the bin partially or entirely covers the paddle, rotation of the paddle is stopped and the torque exerted by the motor actuates a Micro-switch in the motor housing.

For a bulletin on the Roto-Bin-Dicator, circle 388 on the Reader Service card.

## RS-389 Baughman SF-5 Bulk Body

Faster delivery, bigger payloads and less maintenance are offered by the Baughman Model SF-5 bulk material body with full hydraulic operation, according to Baughman Mfg. co., the manufacturer.

The model is available in lengths from 10 feet to 34 feet, truck or trailer mounted, with chain and flight or belt discharge.

Full hydraulic operation is controlled from rear-of-body positions, with two control valves at rear left side of body. One controls the speed of the body conveyor and the cross feed auger, while the other controls the speed of vertical and discharge augers.



Two methods of discharge are possible—directly into grills or hoppers or onto the ground and from the swivel conveyor. Baughman says the SF-5 can unload up to a ton a minute, depending on material.

For an illustrated brochure, circle 389 on the Reader Service card.

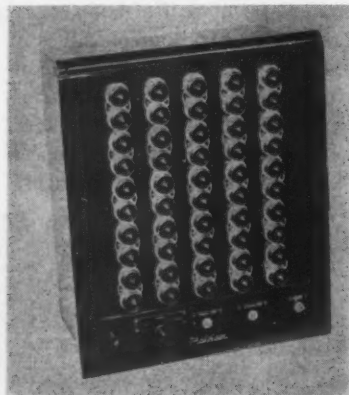


## Classified

**FOR SALE:** Mikro-pulverizer, Model 2TH. Complete with 10 HP drive and power feed screw. Excellent condition. W. C. Rockwell, Box 66, Wasco, Calif.

## Fielden Electronic Scanner Device

Checking and controlling various steps in production processes now are greatly simplified through use of a recently developed electronic scanning instrument, reports Robertshaw-Fulton Controls co. The Fielden electronic scanner may be used in any industrial or laboratory process to monitor variables including temperature, level, flow and pressure. The company said new design characteristics contained in the scanner make possible unparal-



leled economies in bridging the gap from manual to automatic plant operation. For example, all 25 control points may be set in a matter of minutes by untrained personnel, using a bank of miniaturized slide wires.

## All Welded Bodies For 17 Hand Trucks

Seventeen sizes and models of American Hand Trucks, heretofore of bolted construction, will now be manufactured as complete welded units, reports the manufacturer, American Pulley co.

## Suppliers' Briefs

**Arkell & Smiths** recently installed a new 5 color press in its Canajoharie, N. Y., plant, to provide fine quality letterpress printing for specialty bag customers.

Ed M. Peterson has joined the company as a flexible packaging sales representative. Formerly with Scioto Paper co., he will work under the direction of Tom L. Jones out of the firm's Columbus office.

**Bemis Bro. Bag co.** Frank M. Ewer, vice-president, director and head of the Boston Burlap dept., will retire Sept. 30 after 59 years service.

Henry H. Allen, 82, retired vice president and director of Bemis, died Aug. 13 at his summer home near Huntington, N. Y. after an extended illness.

**Clark Equipment co.** will establish a West Coast plant before the end of the year, George Spatta, president, recently disclosed in an address before The Security Analysts of San Francisco.

He said the West Coast facility, to be located in the San Francisco Bay area, will be used as a parts depot at the outset and later will be expanded as an assembly plant for fork, lift trucks.



Phillips

Clark recently named B. E. Phillips assistant sales manager of its Industrial Truck div. Phillips has been with the company for seven years, the last year as district sales manager with headquarters in New York.

**Continental Can co.** Dr. Robert M. Brick, former director of the School of Metallurgical Engineering at the University of Pennsylvania, has been named

director of the Department of Metallurgy of Continental's Central Research and Engineering div.

**Dorr-Oliver Inc.** Edwin Letts Oliver, founder-chairman of the company, died suddenly at his summer home at Lake Tahoe on Aug. 28 at the age of 77.

**Fruehauf Trailer co.** has been given exclusive manufacturing and distribution rights for the Clark Mobilvan System, a method for transporting large container shipments of merchandise.

Under the agreement, Fruehauf will manufacture the vans and Clark will produce locking mechanisms for Fruehauf.

**Kraft Bag co.** Ed Burgers, Jr., sales representative in the St. Louis area, has been assigned to New York to concentrate on new business development in Metropolitan New York and New York State. His replacement in St. Louis is Frank C. Joos, Jr.

Other Kraft appointments: R. F. Floyd to New York, to cover New England and Metropolitan New York; R. E. Kunze to Kansas City, to cover Kansas, part of Iowa, Missouri and Oklahoma; J. R. Charlton, Minneapolis, covering parts of Wisconsin, Michigan, Minnesota, Iowa, North and South Dakota, also assigned to call on jobber trade in Minnesota for Gilman Gummed Tape div.; R. A. Kurlander, to Montgomery, Ala. as field engineer on packaging machinery in the southernmost states.

**St. Regis Paper co.** reports it has acquired more than 95 per cent of the outstanding capital stock of General Container corp. of Cleveland, O., as a result of an offer of exchange made by St. Regis. Under terms of the offer, holders of General's capital stock will receive 2⅔ shares of St. Regis common for each share of General.

**D. M. Weatherly co.** Harrold L. Kitchens has joined the firm as sales engineer.



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AMMONIUM  
NITRATE—20.5% N.  
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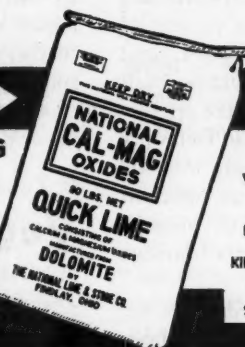
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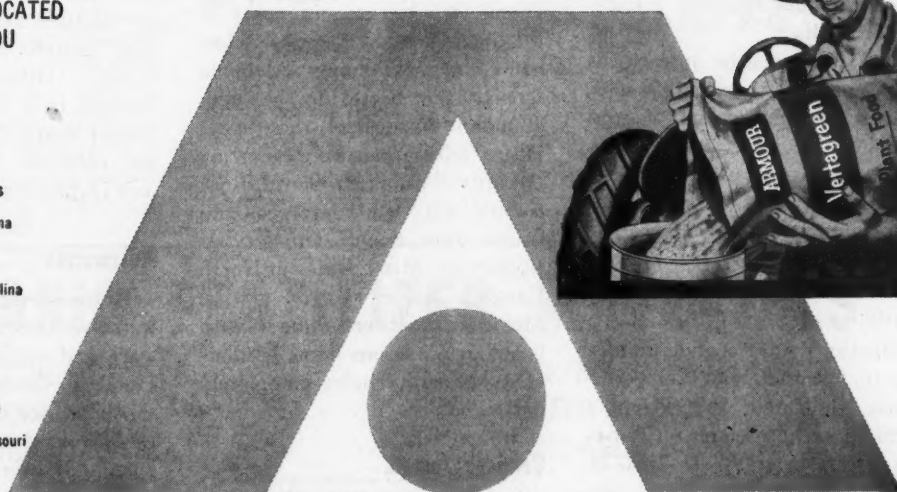
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# PEST REPORTS

*Presented in cooperation with  
the Economic Insect Survey  
Section, Plant Pest Control  
Branch, Agricultural Research  
Service, USDA.*

## Corn Earworm Activity

During late August and early September the corn earworm was rather noticeable on a variety of crops in various areas of the United States. In early September small corn earworm larvae were appearing in lima bean fields in Delaware and Maryland. Damage was still light at that time but sufficient moths were present to indicate that an increase in the damage could be expected.

In Delaware considerable tip injury to sweet corn had been caused by the earworm. Infestations in sweet corn were on the increase in Rhode Island and Pennsylvania. States reporting sorghum being attacked included Virginia, North and South Carolina, Georgia, Alabama, Oklahoma and Kansas. Both Texas and Oklahoma reported infestation in alfalfa.

In Minnesota the insect was more numerous than in 1954 with some south central and central area fields having populations up to 300 larvae per 100 ears. Late field corn in Kansas had infestations ranging up to 96 per cent and Colorado reported infestations up to 95 per cent in Prowers county.

Pupation was getting under way in Colorado and the populations indicated that trouble might be expected later on tomatoes in certain areas. In areas of Washington county, Utah, infestation in sweet corn ranged from 15 to 100 per cent.

California reported heavy infestations on field corn in Merced county as well as infestations in

numerous bean fields causing up to two per cent pod injury and requiring treatment to prevent further damage. Injury to tomatoes by the corn earworm was reported from South Carolina, New Mexico and California.

## Vegetable Insects Active

### Mexican Bean Beetle

Mexican bean beetles were rather active in late August and early September in many areas. This insect was reported as being heavy around Wickford, Rhode Island, troublesome in parts of Michigan and damaging in Goshen county, Wyoming. Alabama reports the beetle to be very abundant in most of that state. Heavy infestations were occurring on butter beans in Santa Rosa county, Fla., while late peas and beans were being damaged at Booneville, Miss. Rains in North Carolina made control of the Mexican bean beetle difficult with beans in numerous home gardens of Ashe county being completely destroyed.

### Cabbage Insects

Cabbage insects were also prominent among the fall vegetable pests. Cabbage loopers were destructive to several vegetables in Delaware. Cabbage and cauliflower carried heavy infestations

in parts of Pennsylvania. In the Arlington, Wisc., area an average of 75 larvae per head was recorded. More than 100 acres of cabbage had been abandoned by early September due to the looper and the state's entire crop was threatened. Michigan, North and South Carolina also reported heavy local infestations. In addition to the cabbage looper the imported cabbageworm was reported infesting crops in Delaware, Pennsylvania, South Carolina and Wisconsin.

### Pickleworm Damage

The pickleworm has been injurious in several states and by early September was reported from Centre county, Pa. Serious damage to cucumbers, squash and cantaloupes was reported from Marshall county, Miss. In some squash fields in the Clarksville, Tenn., area, losses approached 100 per cent. Infestation of cantaloupes at Experiment, Ga., also neared the 100 per cent figure. Other areas reporting damage from the pickleworm included Spartanburg, and Charleston counties, S. C., and Wake and Duplin counties, N. C.

### Hornworms

Hornworms were active on tomatoes and peppers in Delaware and on seedling peppers in Hidalgo county, Texas. Hornworms caused very heavy damage to Maryland tobacco during August and were responsible for some fields not being harvested. In South Carolina controls were necessary to protect late tobacco and a late brood was expected in North Carolina where egg-laying was observed.

### Corn Borers

European corn borers were causing heavy damage to pimento pepper fields in some Alabama counties. Of 35 fields examined in DeKalb, Marshall, Cullam and Blount counties, 29 were found to be infested. Harvesting of peppers was stopped in Marshall county where the greatest amount of borer damage was found.

## Cotton Insect Reports

### Boll Weevil

Although the cotton growing season was about over in most areas by early September several insects were still very much in the picture. Boll weevil infestations were on the increase in Oklahoma and cotton continued to be damaged in the eastern third of Texas. Arkansas infestations remained high and continued to increase on young cotton. The build-up continued in southwest Tennessee and it was expected that a record population might go into hibernation in Mississippi.

Louisiana infestations continued to increase, and all fields checked in Georgia and Alabama were found infested. South Carolina reported an increase of weevils on the top cotton crop in the Piedmont region and migra-

tion was under way in North Carolina. Missouri is alone in reporting fewer boll weevils than for the past two or three years.

### Bollworms

Bollworms on cotton have also been heavy in widespread areas. Heavy infestations were reported from eastern Riverside county, Calif., and on the increase in the San Joaquin valley although generally light. In Arizona, bollworms were the principal pests of cotton.

The insect was on the increase in the other cotton producing states and, with the egg being deposited, if damage was not already occurring at least some was expected.

Examinations for the pink bollworm showed heavy infestations in the coastal bend counties and along the Brazos River of Texas. The coastal bend counties showed very heavy increase in number of pink bollworms per bushel of trash examined compared with 1954; 827 against 42 last year. This increase is believed due to reduction of acreage in the drought stricken counties.

## Other Insect Notes

### Yellow Clover Aphid

The yellow clover aphid was on the increase in alfalfa in early September in areas of California,

Arizona, New Mexico and Kansas. Heaviest infestations in Nebraska were in Republican River valley. Utah and Oklahoma reported severe damage in a few counties.

### Cereal and Forage Pests

Other cereal and forage insect activity of particular interest during the period included unusual abundance of European corn borer in Wisconsin and abundance of corn rootworm, plant bugs, fall armyworm and alfalfa caterpillar in some other states.

### Mites on Fruit

The more important fruit insects during the period were mites in New Mexico, Colorado and Minnesota. These pests were on the increase in the Orleans, Ind., area. In the Vincennes area of that state *Tetranychus* species increase occurred about 60 days later than in 1954.

European red mite injury in northern Indiana was more severe on all fruits than in 1954. In southern Illinois populations were on the increase but little injury noted. At Shelby, Michigan, peaches and plums were being damaged.

### Oriental Fruit Moth

Oriental fruit moth caused heavy damage to late peaches in central Pennsylvania, and red-banded leaf roller injury to this crop was unusually prevalent in Ohio. ▲

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# FERTILIZER MATERIALS MARKET

## New York

September 12, 1955

**Sulfate of Ammonia.** While some export business was reported recently, domestic movement is considered on the slow side as fertilizer buyers hesitate to load up on inventory. In some cases manufacturers' storage space is becoming a problem.

**Ammonium Nitrate.** Since recent price reductions were reported, a better movement was reported under way in ammonium nitrate. However, some sections were reporting decreased use of this material.

**Urea.** With present domestic prices lower than imported, a steady market is looked for although demand for the fertilizer grade is rather poor at present.

**Nitrogenous Tankage.** Demand was considered slow for this material with many fertilizer buyers remaining out of the market. While no price changes were reported most producers were looking for business.

**Castor Pomace.** A limited amount was recently offered at \$40 per ton, f.o.b. production point, and was quickly taken by buyers. A shortage of this material is expected during the coming season because of the present small production.

**Organics.** Little interest was shown by either fertilizer or feed buyers in organic fertilizer materials. Last sales of tankage were made on basis of \$5.25 per unit of ammonia (\$6.38 per unit N), f.o.b. eastern points and some blood moved at \$5.50 (\$6.68 per unit N). Cottonseed meal was easier in price as new crop material was available. Soybean meal for quick shipment commanded a premium up to \$57.50 per ton, f.o.b. Decatur, Ill. in bulk, but futures were available at around

\$50 per ton, f.o.b. Decatur. Linseed meal was firm in price.

**Fish Meal.** Because of the recent storms in Northern waters, fishing was poor and the fish factories were reluctant to make offerings except at higher prices. The market was extremely firm in price with last sales on basis of \$139 per ton, f.o.b. fish factories. Some imported meal was said to be available.

**Bone Meal.** This market was steady at \$65 per ton, f.o.b. production points, for both fertilizer and feed grades. It is considered likely prices may be advanced shortly by the producers.

**Hoof Meal.** Sales recently made on basis of \$6.25 per unit of ammonia (\$7.59 per unit N), f.o.b. Chicago with good inquiry reported from industrial buyers. Little material was available for prompt shipment.

**Superphosphate.** With strikes still on at some of the phosphate mines, a reduced production was looked for although some companies have already settled with the strikers and are back in operation. No great shortage is reported as yet.

**Potash.** This market was strictly a routine affair with most producers keeping after buyers to obtain necessary instructions for quotas previously contracted.

## Philadelphia

September 12, 1955

There is a very slow market in fertilizer materials, which is more or less seasonal. While supplies are quite ample, export shipments have tended to keep nitrogen inventories down. There is no apparent tightness of supply except in the case of fish meal and scrap.

**Sulfate of Ammonia.** Demand is somewhat irregular with supply quite adequate. However,

the movement is expected to pick up before the end of this month to obtain benefit of price discount. September price is given as \$40, with October \$41, and \$42 thereafter—per ton.

**Nitrate of Ammonia.** Situation remains quiet with the export demand helping to reduce excess accumulation of stocks. Production has been quite ahead of last year. Quotations are unchanged.

**Nitrate of Soda.** This is seasonally quiet without price change, and with ample stocks to meet requirements.

**Blood, Tankage, Bone.** Supplies are sufficient to meet present demands. Blood is somewhat easier at about \$5.25 per unit ammonia (\$6.38 per unit N), and tankage moves rather slowly at about \$5.00 per unit (\$6.08 per unit N). Bone is quoted at \$62.50 to \$65 per ton, for 3 and 50 fertilizer grade.

**Castor Pomace.** This is quoted in limited supply at \$40 per ton.

**Fish Scrap.** Market is strong and offerings scarce due to bad weather interference with fishing operations. Priced nominally at \$125 to \$130 per ton for scrap, and \$130 to \$135 for meal, per ton.

**Phosphate Rock.** The strike in Florida has been settled at all but two plants. It is announced that recent increased fuel price and advances in wages have resulted in 30 cents per ton additional cost on all grades of Florida rock, over prices published in the spring.

**Superphosphate.** No price changes reported, and supplies of both normal and triple grades are said to be satisfactory.

**Potash.** Market is quiet with no change in prices, and stocks are accumulating. However, the demand for fall mixing is expected to bring some activity shortly.



## Literature

**Chemical Engineering Cost Estimation**, by Robert S. Aries and Robert D. Newton. McGraw-Hill Book co., inc. 263 pages. \$6.00.

This volume is aimed at outlining the principles of cost estimation and evaluation and at providing quantitative data for application of the techniques discussed to solving problems encountered in modern industrial practice.

It will aid management in extracting from project reports the information needed to prepare an economic estimate and will help the engineer or chemist to bridge the gap between technical details of the project and economic factors.

McGraw-Hill says that it is the first single volume to cover the entire scope of cost estimation.

**American Management Association**, 330 W. 42nd St., New York 18, N. Y. (Address Publications Sales, Dept. P, AMA):

**Know Your Packaging Materials**, Packaging Series 46. 123 pages. \$1.75.

A compilation of papers presented at the AMA Packaging Conference held last spring in Chicago. The materials discussed include foils, paper, films, box-board and foam plastics.

**Broadening the Sales Department's Role**, Marketing Series No. 94. 32 pages. \$1.75.

Four company presidents indicate what they expect from sales management, discussing responsibility to keep production lines operating, relating sales planning to over-all objectives, developing a profit viewpoint in the sales force and the role of the sales

department in product development.

Included are L. B. McKnight, Chain Belt co.; H. E. Chiles, Jr., The Western co.; Irving Osborne, Jr., Cornell Paperboard Products co.; James E. Robison, Indian Head Mills, Inc.

A fifth company head, J. S. Sayre, Norge Div., Borg-Warner corp. previews the sales manager's job in the next decade.

**Guides to Strengthening the Sales Effort**, Marketing Series No. 95. 63 pages. \$1.75.

Staff problems discussed include effective use of an "assistant to the sales chief," developing a communications program that stimulates salesmen, merging new product lines into your sales organization and reviving a lagging sales curve.

The use of two outside agencies, management consultants and advertising agencies are considered in two additional papers.

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# by Dr. Melvin Nord

# PATENT REVIEWS

## Apparatus for the Preparation of Fertilizer Material

US 2,710,423 and 2,710,795, issued June 14, 1955 to Edwin J. Douglas and assigned to Stauffer Chemical co., describe devices for producing substantially uniform spheres or granules of fertilizer materials.

In the batch apparatus, a fertilizer material may be mixed with a liquid such as water, sulfuric acid, nitric acid, phosphoric acid, liquid ammonia, ammonia solution, and ammonium salt, nitrate solution, etc. A plastic is formed while a portion of the mass is withdrawn and formed into spheroids, which are returned and mixed into the mass. The process continues until the entire mass consists of spheroids of the desired size. A continuous apparatus for producing the same result is also described.

The apparatus can be used not merely for producing granules, but also for reacting phosphate rock with phosphoric acid to produce triple superphosphate.

Fig. 1 shows the continuous apparatus. In general, it consists of a rotary drum (211), mounted at a slight downward angle allowing the material to travel progressively through, and a rotor (221) made up of a number of cutting blades.

## Fungicide Composition

US 2,710,822, issued June 14, 1955 to David R. Golding and Bert L. Richards, Jr., discloses fungicidal compositions employing manganous ethylene bisdithiocarbamate in mixture with water-

soluble methylcellulose. According to the inventors, the addition of the methylcellulose increases fungicidal activity, and results in longer retention of fungicidal activity following application.

## Weed Killer Containing Borax

US 2,711,367, issued June 21, 1955 to Clifford A. Parish, Sr., provides a slurry-type weed killer. It contains about 1 pound of aluminum sulfate, 1 lb. of borax and 1 to 5 gallons of water, and is applied by spraying.

According to the inventor, some sort of reaction occurs between the aluminum sulfate and the borax, and a synergistic effect is obtained.

## Flotation Concentration Processes

US 2,706,559, by James B. Duke, assigned to Minerals & Chemicals corp. of America, describes a process for flotation concentration of potash ores. A high grade concentrate of finely divided

sylvite is produced, and also a coarser concentrate of lower grade, suitable for use as a fertilizer.

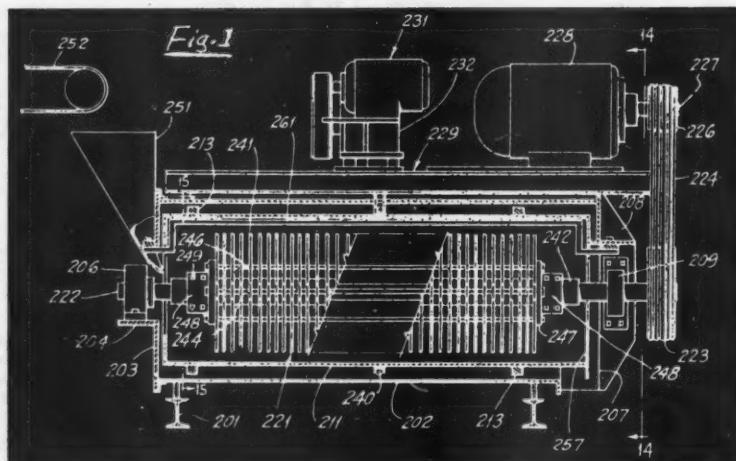
## Production of Phosphoric Acid

US 2,708,620, issued May 17, 1955 to Henry S. Winnicki and assigned to Food Machinery & Chemical corp., describes a method and apparatus for producing phosphoric acid from elemental phosphorus.

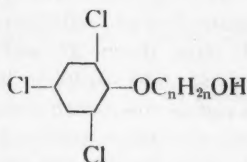
Phosphorus is burned in an unlined stainless steel tower to produce phosphorus pentoxide in the vapor phase, and 75 per cent aqueous phosphoric acid is flowed in a thin film down along the inner wall of the tower. Water is vaporized in the tower, hydrating and absorbing the phosphorus pentoxide vapors into the flowing film of phosphoric acid. Water is flowed along the outside wall of the tower to remove heat from the acid, maintaining a wall temperature of 70-80°C. This is low enough to avoid corrosion of the equipment. Uncondensed gases are removed from the tower, and the acid is recirculated from the bottom back to the top of the tower.

## Herbicides

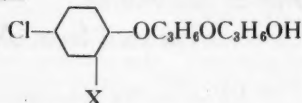
US 2,712,990 and 2,712,991, issued July 12, 1955 to Arthur W. Swezey and assigned to The



Dow Chemical company, describe two new herbicides, i.e. a trichlorophenoxyalkanol of the formula



where n is 2 or 3, and a chloraryl-oxypropoxypropanol of the formula

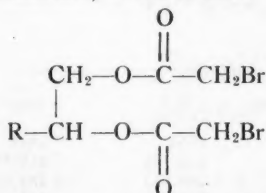


where X is chlorine or a methyl radical

## Plant Growth Composition

US 2,711,949, issued June 28, 1955 to Keith C. Barrons, and assigned to The Dow Chemical co., describes a method and composition for controlling weeds and also for maturation of crop plants prior to harvesting and of nursery stock prior to storage.

The substance having these properties is a glycol bis (monobromacetate) of the formula



where R represents hydrogen or a methyl radical.

## Improvement of Soils

US 2,702,965 and 2,702,966, issued March 1, 1955 to Thomas Boyd and assigned to Monsanto Chemical co., describe mixtures used for improving soil. When added to the soil, these mixtures overcome the natural balling tendencies of the soil when wet, and prevent the baking of soil into a hard cake when dry.

The mixtures consist of a polymer of acrylonitrile and an

## Plant Safety Tip #4

# Lift Truck Accident

**The Accident** A 19 year old fertilizer plant employee, with the firm two months, fractured three fingers while loading filled bags of plant food onto pallets.

**Cause** Instead of walking from one place to another, he rode on an empty pallet which was being carried by a lift truck, and inadvertently stuck his hand into the boom, unnoticed by the lift truck operator. When the operator raised the boom, then lowered it, the employee's hand became caught, resulting in the fractured three fingers. Lost time: Four days temporary total disability.



**Action Taken** In this incident no safeguards were lacking; there was an infraction of the rule that no one is to ride pallets. Employees were told that anyone other than the driver found riding any tractor equipment would be discharged immediately. The ruling was followed up by careful observance of personnel.

oxide, hydroxide or carbonate of an alkaline earth metal. As an example: Mix 100 parts of a dry pulverized polymer of acrylonitrile with 56 parts of dry calcium oxide. Add 10 parts of the mixture to 100 parts of dry Miami silt loam and then stir into the mixture 30 parts of water. When a homogeneous mixture of clay, polymer, calcium oxide and water is obtained the clay particles aggregate into small, free-flowing crumbly lumps which appear to be substantially dry to the touch.

If this homogeneous mixture is allowed to stand at room temperature for a few hours a distinct odor of ammonia is observed. In contrast, mix 100 parts of clay with 30 parts of water, as thoroughly as possible. The clay balls up into a large ball of mud which is wet and sticky. The addition of calcium oxide to the clay and water does not improve

the aggregation characteristics of the clay.

Spread parts of each of the above mixtures on a glass plate at room temperature and allow them to dry for 24 hours. The clay containing the polymer and calcium oxide is still aggregated but the clay containing no polymer and calcium oxide is a hard film which crumbles up into a fine dust.

## Defoliation of Growing Plants

US 2,710,794, issued June 14, 1955 to Geoffrey E. Barnsley, assigned to Shell Development co., discloses nitrosoureas containing not more than 10 carbon atoms as defoliant for living plants.

The patent cites a number of particular compounds, as well as examples of their use. ▲



# Statistics

## Three States Issue Fertilizer Reports

Three states have now issued tonnage reports, Kentucky and Wisconsin for 1954-55 and Missouri for the first six months of 1955.

Kentucky reports a mixed fertilizer tonnage of 419,000 tons, down 7 per cent from 1953-54 and a drop of 17 per cent in tonnage of straight materials which fell to 105,000 tons. Total tonnage of 524,000 tons represented a decrease of 9 per cent.

The increased use of higher analysis goods pulled actual plant food sales to within 4,000 tons of the 1953-54 figure. Higher analysis grades jumped an average of 42 per cent in tonnage while those with relatively low analysis dropped off 27 per cent when averaged together. The average analysis of mixed fertilizer in this state now exceeds 26 units of plant food.

In Missouri, sales totaled 411,345 tons of which 268,648 was in the form of mixed goods. The top grade by a wide margin was 12-12-12 with 75,033 tons reported.

Ammonium nitrate led nitrogenous materials with 40,135 tons followed by anhydrous ammonia and nitrogen solutions at 11,557 and 3,090 tons respectively.

A slight decrease in fertilizer tonnage was noted in Wisconsin where sales were reported at 427,953 tons, compared to 436,452 tons in 1953-54. Complete mixed goods represented 317,206 tons of the total, phosphate and potash mixtures another 80,156 tons.

The ratio between tonnages for the fall and spring seasons remained about the same at slightly better than 4:1 in favor of spring usage.

## Super Production Shipments Down

During June, superphosphate production totaled 147,744 short

tons (100 per cent APA) according to the Bureau of the Census, down 30 per cent from May and 13 per cent less than June, 1954.

Shipments of all grades totaled 68,573 tons, down 37 and 11 respectively, and stocks on hand at the end of the month were 18 per cent over those held on June 1, 15 per cent more than the quantities on hand as of June 30, 1954.

## One of Six Acres Treated from Air

One out of every six acres of cropland is now treated with dust, spray, fertilizer or other chemicals applied by airplane, according to Texas A&M. The college estimates that aerial farming adds about 3 billion dollars a year to farm income.

More than 7,000 planes are now operated by private flying companies and each year these craft apply about 644 million pounds of dust formulations and 80 million gallons of sprays.

## Production — June, 1955

Compiled from Government Sources

Chemical	Unit	June		May
		1955	1954	1955
Ammonia, synth. anhydrous.....	s. tons	261,285	216,786	269,799
Ammonia liquor, coal & coke (NH <sub>3</sub> content).....	pounds		3,240,433	3,431,667
Ammonia nitrate, fert. grade (100% NH <sub>4</sub> NO <sub>3</sub> ).....	s. tons	129,765	116,189	135,265
Ammonium sulfate				
synthetic (technical).....	s. tons	90,735	58,439	104,138
coke oven by-product.....	pounds		130,250,708	171,251,310
BHC (Hexachlorocyclohexane).....	pounds	5,063,757	7,738,483	5,013,168
Gamma content.....	pounds	951,286	1,250,870	977,818
Copper sulfate (gross).....	s. tons	6,920	5,564	7,340
DDT.....	pounds	**10,618,095	9,401,444	10,703,051
2,4-D Acid.....	pounds	3,328,348	3,058,983	2,881,463
esters and salts.....	pounds	**3,408,057	2,412,404	3,572,790
esters and salts (acid equiv.).....	pounds	**2,529,274	1,828,497	2,744,981
Lead arsenate (acid and basic).....	s. tons	296	323	406
Phosphoric acid (50% H <sub>3</sub> PO <sub>4</sub> ).....	s. tons	261,312	240,009	306,851
Sulfur, Native (Frasch).....	l. tons	425,050	455,174	455,508
Recovered.....	l. tons	32,500	30,500	35,800
Sulfuric acid, gross (100% H <sub>2</sub> SO <sub>4</sub> ).....	s. tons	1,254,280	1,108,225	1,372,743
Chamber Process (100% H <sub>2</sub> SO <sub>4</sub> ).....	s. tons	162,852	181,469	183,351
Contact Process (100% H <sub>2</sub> SO <sub>4</sub> ).....	s. tons	1,091,428	926,756	1,189,392
Superphosphate (100% APA).....	s. tons	147,744	169,497	*210,818
Normal (100% APA).....	s. tons	97,838	123,075	*132,054
Enriched (100% APA).....	s. tons	1,497		5,303
Concentrated (100% APA).....	s. tons	48,187	46,266	*73,024
Wet Base (100% APA).....	s. tons	222	156	437
2,4,5-T Acid.....	pounds	176,472	209,435	377,406
TEPP.....	pounds			56,527

\* Revised. \*\* Partly estimated.



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Malcolm Smith, John R. Riley and George V. Taylor, officers of Southern Nitrogen co., examine a map of the plant site. Construction is set to begin this fall.

## Savannah Unit for Southern Nitrogen

PLANS for construction of a \$14 million petrochemical plant at Savannah, Ga. have been announced by Southern Nitrogen co. According to John R. Riley, president, it will be completely integrated with a 250 ton/day ammonia plant and other units for production of nitrogen solutions, fertilizer grade ammonium nitrate, urea and nitric acid.

Riley pointed out that it will be the first synthetic nitrogen plant in the South Atlantic area and he estimated its operation will result in about \$3 million annual savings for farmers and the fertilizer industry. Operation is expected to begin late next year.

In addition to Riley, former vice president and director of Spencer Chemical co., organizers of Southern Nitrogen include Malcolm Smith, chairman of the board, and Geo. V. Taylor, vice president. Smith, a limited partner of Dean Witter & co., was formerly a partner of J. H. Whitner & co. and Glore Forgan & co. and was a Spencer director; Taylor had been director of product sales for Spencer.

Arrangements have been completed by the company for raising part of its \$18 million financing through a long-term insurance company loans and through sales of securities. The \$4 million remaining after allocation of construction costs will be used for pre-operating expense and working capital. ▲

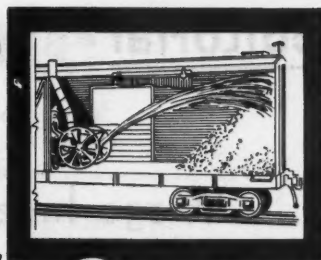
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## **editorial**

### **Wage Incentives**

**W**AGE incentives for production employees in small businesses were discussed in a recent issue of the Oklahoma Business Bulletin by Fergus G. Chandler of McClure, Hadden and Ortman, Inc. who pointed out that the advantages to both company and worker are several but that much care is needed in developing the basic plan and in administering it after establishment. Chandler offered these precautions to those considering such plans:

- They will not bolster an unsound base rate structure and should not be adopted as a subterfuge in place of needed wage adjustments.
- Capable supervision will still be needed.
- The employee must have a chance to earn enough to make additional effort worthwhile so standards should be attainable and a respectable premium should be paid for above-normal production.
- Don't cut rates when workers begin to earn extra money; changes should be made only after changes in method, material or equipment.
- Everyone concerned should be briefed on the plan—management, workers and union—bring the latter groups in on early phases of development and make them active participants.
- Recognize incentives as a management tool providing benefit to both management and employees.

Success or failure is relatively independent of company size—Chandler speaks of successful plans in businesses with as few as 20 workers.

It does require sound, accurate planning, sensible premiums and adequate standard times and allowances. Coverage should be as complete as possible for the plan can be easily jeopardized by partial installation where only a portion of the employees are offered the wage gain opportunity.

The individual, a group or overall personnel can be the basis, depending on your conditions. An individual basis is preferred, the group ranks as second choice, but can be effective through production of several workers engaged in a common assignment and dividing resultant premium earnings according to hours worked by each individual.

**T**HREE methods can be used to install such a plan, said Chandler, if you lack qualified assistants—you can hire necessary personnel as staff additions, employ a management engineer to develop and install the plan and then train one of your own men

to run it, or you may get assistance through an accredited university as a research or lab project.

Once the plan is established, regular management and administration will be required and there should be some qualified time-study or job analysis assistance for periodic check-ups or to extend the scope into new areas.

Will such a venture pay off? You're the only one that can answer that. If you feel employee potential is not being reached or maintained, careful investigation of incentives may be in order. Theoretically, a sound plan will save money through increases in employee performance level.

For a true picture, says Chandler, gross savings over a period of time must be balanced against costs of initiating the plan plus running expenses during the period. If, with a sound plan, you can't recover initial costs in a reasonably short time and can't hold running costs well below realized savings, don't go any further.

**S**TANDARD-TIME or piece-work methods can be used to determine wage payment. The first would seem best adapted to your needs and has the added advantages of being easily understood, easily adjusted for changes and can be used with time as the common denominator in planning and scheduling.

After determining net time through actual time study, using predetermined time values or adapting standard data, allowances must also be set up covering usual interruptions such as personal, those caused by the employee satisfying personal needs; unavoidable delays, through mechanical delays, etc.; fatigue, the tendency to slow down as workers get tired; and incentive, the added inducement to increase output over normal expectations.

Although no over-all allowance percentage will meet all needs, Chandler provides these as average ranges: personal—2½ to 10 per cent; unavoidable delays—2 to 15 per cent; fatigue—3 to 10 per cent; and incentive—0 to 30 per cent for manual time, 5 to 40 per cent for machine time.

Once net time is determined along with the necessary allowance adjustments, standard time is set up by simple multiplication.

Wide variations also occur in wage premiums with some companies allowing full base rate for each premium hour worked, others offering premium earnings on some percentage of premium hours. The worker, of course, prefers a "1 for 1" plan providing full benefit for any production increase resulting from his effort.

With the profit margin seemingly growing ever smaller for many small businesses, wage incentives might aid you in improving your competitive position.

G. P. T., JR.  
Editor

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Clover Chemical Co., Pittsburg, Pa.

### FERTILIZER—Mixed

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Davison Chemical Co., div. of W. R. Grace & Co., Baltimore, Md.  
International Min. & Chem. Corp., Chicago, Ill.

### FERTILIZER—Organic

Lebanon Chemical Corp., Lebanon, Pa.

### FILLERS

Bradley & Baker, N. Y. C.

### FISH SCRAP AND OIL

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
Jackle, Frank R., New York City  
Woodward & Dickerson, Inc., Philadelphia, Pa.

### FULLER'S EARTH

Ashcraft-Wilkinson Co., Atlanta, Ga.

### FUNGICIDES

American Agricultural Chemical Co., N. Y. C.  
Berkshire Chemicals, New York City  
Metalsalts Corp., Hawthorne, N. J.  
Tennessee Corp., Atlanta, Ga.

### HERBICIDES

American Potash & Chemical Corp., Los Angeles, California  
Barco Chemicals, Inc., Des Moines, Ia.  
Lion Oil Company, El Dorado, Ark.

### HERBICIDES—Oils

Lion Oil Company, El Dorado, Ark.

### HOPPERS & SPOUTS

Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.

### IMPORTERS, EXPORTERS

Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Berkshire Chemicals, New York City  
Woodward & Dickerson, Inc., Philadelphia, Pa.

### INSECTICIDES

American Agricultural Chemical Co., N. Y. C.  
American Potash & Chemical Corp., Los Angeles, California  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Barco Chemicals, Inc., Des Moines, Ia.  
Berkshire Chemicals, New York City  
Fairfield Chem. Div., Food Mach. & Chem. Corp., New York City  
Pennsylvania Salt Mfg. Co., of Wash., Tacoma, Wash.  
Shell Chem. Corp., Agr. Chem. Div., Denver, Colo.

### IRON SULFATE

Tennessee Corp., Atlanta, Ga.

### KAOLIN

Thomas Alabama Kaolin Co., Baltimore, Md.

### LEAD ARSENATE

American Agricultural Chemical Co., N. Y. C.

### LIMESTONE

American Agricultural Chemical Co., N. Y. C.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
National Lime & Stone Co., Findlay, Ohio

### MACHINERY—Acid Making and Handling

Chemical Construction Corp., New York City  
Monarch Mfg. Works, Inc., Philadelphia, Pa.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.

### MACHINERY—Acidulating

Chemical Construction Corp., New York City  
Stedman Foundry and Machine Co., Aurora, Ind.

### MACHINERY—Grinding and Pulverizing

Bradley Pulverizer Co., Allentown, Pa.  
Poulsen Co., Los Angeles, Calif.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.  
Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.

# Buyers' Guide

## MACHINERY—Material Handling

Clark Equip. Co., Construction Mach. Div., Benton Harbor, Mich.  
Hough, The Frank G. Co., Libertyville, Ill.  
Jaeger Machine Co., Columbus, O.  
Link-Belt Co., Chicago, Ill.  
Poulsen Co., Los Angeles, Calif.  
Power-Curve Conveyor Co., Denver, Colo.  
Sauerman Bros. Inc., Chicago, Ill.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Stephens-Adamson Mfg. Co., Aurora, Ill.  
Sturtevant Mill Co., Boston, Mass.

## MACHINERY—Mixing and Blending

Munson Mill Mach. Co., Utica, N. Y.  
Poulsen Co., Los Angeles, Calif.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.

## MACHINERY—Mixing, Screening and Bagging

Poulsen Co., Los Angeles, Calif.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.

## MACHINERY—Power Transmission

Link-Belt Co., Chicago, Ill.  
Stedman Foundry and Machine Co., Aurora, Ind.

## MACHINERY

### Superphosphate Manufacturing

Link-Belt Co., Chicago, Ill.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.

## MAGNESIUM SULFATE

Berkshire Chemicals, New York City

## MANGANESE SULFATE

Tennessee Corp., Atlanta, Ga.

## MANURE SALTS

Potash Co. of America, Washington, D. C.

## MINOR ELEMENTS

Tennessee Corporation, Atlanta, Ga.

## MIXERS

Munson Mill Mach. Co., Utica, N. Y.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.

## NITRATE OF POTASH

Berkshire Chemicals, New York City

## NITRATE OF SODA

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
McIver & Son, Alex. M., Charleston, S. C.  
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.  
International Min. & Chem. Corp., Chicago, Ill.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## NITROGEN SOLUTIONS

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Commercial Solvents Corporation, New York City  
Escambia Bay Chem. Corp., Pensacola, Fla.  
Mississippi River Chem. Co., St. Louis, Mo.  
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.  
Lion Oil Company, El Dorado, Ark.  
Sohio Chemical Co., Lima, O.  
Phillips Chemical Co., Bartlesville, Okla.

## NITROGEN MATERIALS—Organic

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
International Min. & Chem. Corp., Chicago, Ill.  
Jackle, Frank R., New York City  
McIver & Son, Alex. M., Charleston, S. C.  
Smith Rowland Co., Norfolk, Va.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## NOZZLES—Spray

Monarch Mfg. Works, Philadelphia, Pa.  
Spraying Systems Co., Bellwood, Ill.

## ORGANIC MERCURY COMPOUNDS

Metalsalts Corp., Hawthorne, N. J.

## PARATHION

Ashcraft-Wilkinson Co., Atlanta, Ga.

## PHOSPHATE ROCK

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
International Min. & Chem. Corp., Chicago, Ill.  
McIver & Son, Alex. M., Charleston, S. C.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## PHOSPHORIC ACID

American Agricultural Chemical Co., N. Y. C.

## PLANT CONSTRUCTION—Fertilizer and Acid

Atlanta Utility Works, The, East Point, Ga.  
Chemical Construction Corp., New York City  
Link-Belt Co., Chicago, Ill.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.

## POTASH—Muriate

American Potash & Chemical Corp., Los Angeles, California  
Ashcraft-Wilkinson Co., (Duval Potash) Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
Duval Sulphur & Potash Co., Houston, Tex.  
International Min. & Chem. Corp., Chicago, Ill.  
McIver & Son, Alex. M., Charleston, S. C.  
Potash Co. of America, Washington, D. C.  
Southwest Potash Corporation, New York City  
United States Potash Co., N. Y. C.

## POTASH—Sulfate

American Potash & Chemical Corp., Los Angeles, California  
International Min. & Chem. Corp., Chicago, Ill.  
Potash Co. of America, Washington, D. C.

## PRINTING PRESSES—Bag

Schmutz Mfg. Co., Louisville, Ky.

## PYROPHYLLITE

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Pioneer Pyrophyllite Producers, Beverly Hills, Calif.

## REPAIR PARTS AND CASTINGS

Atlanta Utility Works, The, East Point, Ga.  
Stedman Foundry and Machine Co., Aurora, Ind.

## SCALES—Including Automatic Baggers

Atlanta Utility Works, The, East Point, Ga.  
Stedman Foundry and Machine Co., Aurora, Ind.

## SCRAPER MACHINES

Sauerman Bros., Inc., Chicago, Ill.

## SCREENS

Atlanta Utility Works, The, East Point, Ga.  
Ludlow-Saylor Wire Cloth Co., St. Louis, Mo.  
Stedman Foundry and Machine Co., Aurora, Ind.  
Sturtevant Mill Co., Boston, Mass.  
Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.

## SEPARATORS, AIR

Williams Patent Crusher & Pulverizer Co., St. Louis, Mo.

## SHOVEL LOADERS

Clark Equip. Co., Benton Harbor, Mich.  
Hough, The Frank G. Co., Libertyville, Ill.  
Jaeger Machine Co., Columbus, O.

## SOLVENTS

Crowley Tar Products Co., New York City  
Richfield Oil Corp., Los Angeles, Calif.

## SPRAYS

Monarch Mfg. Works, Inc., Philadelphia, Pa.  
Spraying Systems Co., Bellwood, Ill.

## SPREADERS, TRUCK

Highway Equipment Co., Cedar Rapids, Ia.

## STORAGE BUILDINGS

Butler Manufacturing Co., Kansas City, Mo.

## STORAGE TANKS

Broadway Rubber Corp., Louisville, Ky.  
Butler Manufacturing Co., Kansas City, Mo.  
Cole, R. D., Manufacturing Co., Newnan, Ga.

## SULFATE OF AMMONIA

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.

Bradley & Baker, N. Y. C.  
Jackle, Frank R., New York City  
Lion Oil Co., El Dorado, Ark.  
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.  
Phillips Chemical Co., Bartlesville, Okla.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## SULFATE OF POTASH—MAGNESIA

International Min. & Chem. Corp., Chicago, Ill.

## SULFUR

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Texas Gulf Sulphur Co., New York City  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## SULFUR—Dusting & Spraying

Ashcraft-Wilkinson Co., Atlanta, Ga.  
U. S. Phosphoric Products Div., Tennessee Corp., Tampa, Fla.

## SULFURIC ACID

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
International Min. & Chem. Corp., Chicago, Ill.  
Lion Oil Company, El Dorado, Ark.  
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.

## SUPERPHOSPHATE

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
Davison Chemical Co., div. of W. R. Grace & Co., Baltimore, Md.  
International Min. & Chem. Corp., Chicago, Ill.  
Jackle, Frank R., New York City  
McIver & Son, Alex. M., Charleston, S. C.  
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## SUPERPHOSPHATE—Concentrated

Armour Fertilizer Works, Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
International Min. & Chem. Corp., Chicago, Ill.  
U. S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## TALC

Ashcraft-Wilkinson Co., Atlanta, Ga.

## TANKAGE

American Agricultural Chemical Co., N. Y. C.  
Armour Fertilizer Works, Atlanta, Ga.  
Ashcraft-Wilkinson Co., Atlanta, Ga.  
Bradley & Baker, N. Y. C.  
International Min. & Chem. Corp., Chicago, Ill.  
Jackle, Frank R., New York City  
McIver & Son, Alex. M., Charleston, S. C.  
Smith-Rowland Co., Norfolk, Va.  
Woodward & Dickerson, Inc., Philadelphia, Pa.

## TANKS—NH3 and Liquid N

Broadway Rubber Corp., Louisville, Ky.  
Butler Manufacturing Co., Kansas City, Mo.  
Cole, R. D. Manufacturing Co., Newnan, Ga.  
KBH Corporation, Clarksdale, Miss.

## TOXAPHENE

Ashcraft-Wilkinson Co., Atlanta, Ga.  
Pittsburgh Coke & Chem. Co., Agr., Chem. Div., Pittsburgh, Pa.

## TRUCKS—SPREADER

Highway Equipment Co., Cedar Rapids, Ia.

## UREA & UREA PRODUCTS

Bradley & Baker, N. Y. C.  
Grand River Chem. Div., Deere & Co., Tulsa, Okla.  
Nitrogen Div., Allied Chemical & Dye Corp., N.Y.C.  
Sohio Chemical Co., Lima, O.

## VALVES

Monarch Mfg. Works, Inc., Philadelphia, Pa.

## ZINC SULFATE

Tennessee Corp., Atlanta, Ga.

FARM CHEMICALS





## **ANOTHER GIANT SERVANT OF AGRICULTURE**

Now there's a *new* giant servant . . . PCA's new giant ore bin, more than 1,000 feet underground, the *only* underground ore bin in North America with a rotary plow feeder.

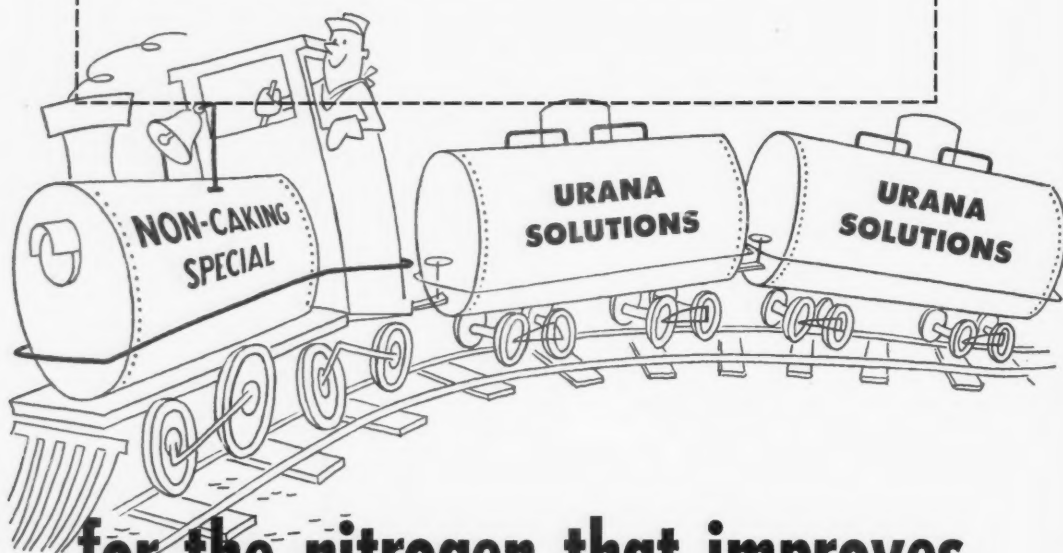
Specially designed by PCA's engineers, planned by the PCA team, this bin and its revolutionary feeder will smooth and increase the flow of ore for the production of the potash that serves American agriculture.



### **POTASH COMPANY OF AMERICA CARLSBAD, NEW MEXICO.**

General Sales Office . . . 1625 Eye Street, N.W., Washington, D.C.  
Midwestern Sales Office . . . First National Bank Bldg., Peoria, Ill.  
Southern Sales Office . . . Candler Building, Atlanta, Ga.

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## for the nitrogen that improves condition of mixed fertilizers

**Some fertilizer producers** consider ARCADIAN® URANA® Nitrogen Solutions their first and foremost aid to assure good physical condition in fertilizers. The reason is crystal clear. The usual mixed fertilizers contain ammonium chloride salts produced by reaction of ammonium salts with potassium chloride. These fern-like, or long, needle-shaped crystals tend to bind together and may cause the fertilizer to cake at the factory and again in the bag.



### PRODUCTS FOR PROFITABLE FARMING

**Nitrogen Solutions**  
(Nitrana® and Urana®)

**American**  
**Nitrate of Soda**

**A-N-L®**  
**Nitrogen Fertilizer**

**Urea Products**  
**Sulphate of Ammonia**

Use URANA 15 (15% urea), URANA 12 (12% urea), or URANA 10 (10% urea) in ammoniation, and the urea makes ammonium chloride form cube-shaped crystals that do not bind and cake. The result is well-cured fertilizer with less conditioning, and often a reduction in costs.

**The right formulation** of your fertilizers with our URANA, NITRANA® and U-A-S\* ("A" and "B") Nitrogen Solutions is important in producing a better conditioned product. For details on other important aids to fertilizer production developed through Nitrogen Division research, consult one of our technical service representatives. Their help is available to customers at no cost.

\*Trade-mark

### NITROGEN DIVISION Allied Chemical & Dye Corporation

New York 6, N. Y.	• Hopewell, Va.	• Ironton, Ohio
Atlanta 3, Ga.	• Columbia 1, S. C.	• Indianapolis 20, Ind.
Omaha 7, Neb.	• San Francisco 3, Cal.	
Los Angeles 15, Cal.	• Columbia, Mo.	• Kalamazoo, Mich.



